Vol. VII. — No. 12. November 1925.

BULLETIN

OF THE

INTERNATIONAL RAILWAY CONGRESS

ASSOCIATION

(ENGLISH EDITION)

[385. (06.111]

TENTH SESSION

LONDON : 22 JUNE-1 JULY 1925

SUMMARY OF PROCEEDINGS

SUMMARY

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LIST OF THE PAPERS PUBLISHED

A. — As the questions are inserted in the agenda for discussion.

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
I (Litt. *A*)	Maintenance of the track . .	1st Report (France), by Mr. R. Ruffieux	1925, vol. VII, p. 699.	26
		2nd Report (America), by Mr. G. J. Ray.	1925, vol. VII, p. 1	10
		3rd Report (all countries, except France, America and the British Empire), by Mr. H. Deyl.	1925, vol. VII, p. 1663.	42
		4th Report (British Empire), by Mr. W. H. Coomber.	1925, vol. VII, p. 675.	25
I (Litt. *B*)	Level crossings (public roads)	1st Report (all countries, except France, America, Italy, Spain and Portugal), by Mr. Maas Geesteranus.	1925, vol. VII, p. 203.	16
		2nd Report (France), by Mr. R. Ruffieux.	1925, vol. VII, p. 761.	27
		3rd Report (America), by Mr. G. J. Ray.	1925, vol. VII, p. 13.	11
		4th Report (Italy, Spain and Portugal), by Mr. D. Mendizabal.	1925, vol. VII, p. 1621.	41
II	Breaking of rails. Joints . .	1st Report (America), by Mr. W. C. Cushing.	1924, vol. VI, p. 677.	1
		2nd Report (British Empire), by Mr. C. J. Brown.	1925, vol. VII, p. 1163.	35

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
II (*continued*)	Breaking of rails. Joints . . (*continued*).	3rd Report (France), by Messrs. Merklen and Cambournac.	1925, vol. VII, p. 1289.	35
		4th Report (other countries), by Mr. J. Willem.	1925, vol. VII, p. 1403.	35
III	Shunting yards	1st Report (all countries, except America Belgium, France and the British Empire), by Mr. W. Simon-Thomas.	1925, vol. VII, p. 237.	17
		2nd Report (America), by Mr. S. T. Wagner.	1924, vol. VI, p. 793.	2
		3rd Report (British Empire), by M. R. H. Nicholls.	1924, vol. VI, p. 877.	4
		4th Report (France and Belgium), by Messrs. Moutier and Pellarin.	1925, vol. VII, p. 1495.	36
IV (Litt. *A*)	Reduction of the cost of traction : fuel and its combustion.	1st Report (America), by Mr. G. H. Emerson.	1924, vol. VI, p. 1029.	8
		2nd Report (British Empire), by Mr. C. B. Collett.	1925, vol. VII, p. 797.	29
		3rd Report (other countries), by Mr. H. Chenu.	1925, vol. VII, p. 1783.	45
IV (Litt. *B*)	Reduction of the cost of traction : lubrication of axle-boxes for all rolling stock.	1st Report (America), by Mr. G. H. Emerson.	1924, vol. VI, p. 1055.	9
		2nd Report (all countries, except America and the British Empire), by Mr. Tête.	1925, vol. VII, p. 859.	30
		3rd Report (British Empire), by Sir Henry Fowler.	1925, vol. VII, p. 313. .	18
V	Electric locomotives	1st Report (America), by Mr. J. T. Wallis.	1925, vol. VII, p. 179.	15
		2nd Report (other countries), by Mr. M. Weiss.	1925, vol. VII, p. 1019.	33
VI	Locomotive sheds	1st Report (British Empire), by Mr. R. E. L. Maunsell.	1925, vol. VII, p. 501.	21
		2nd Report (all countries, except the British Empire and America), by Mr. G. Forte.	1925, vol. VII, p. 1561.	39

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
VI (*continued*)	Locomotive sheds . . . (*continued*).	3rd Report (America), by Mr. R. W. Bell.	1925, vol. VII, p. 765.	28
VII	Dispatching or control systems.	1st Report (all countries, except America and the British Empire), by Mr. E. Epinay.	1925, vol. VII, p. 619.	24
		2nd Report (British Empire), by Mr. J. H. Follows.	1925, vol. VII, p. 389.	19
		3rd Report (America), by Mr. F. P. Patenall.	1925, vol. VII, p. 1085.	34
VIII	Suburban services	1st Report (America and British Empire), by Messrs. E. C. Cox and A. R. Cooper.	1925, vol. VII, p. 31.	12
		2nd Report (other countries), by Mr. Direz.	1925, vol. VII, p. 583.	23
IX	Fixed signals	1st Report (America), by Mr. W. H. Elliott.	1924, vol. VI, p. 907.	5
		2nd Report (all countries, except America, the British Empire, Italy, Belgium, Holland, Denmark, Norway and Sweden), by Mr. Laigle.	1925, vol. VII, p. 439.	20
		3rd Report (British Empire), by Mr. W. J. Thorrowgood.	1925, vol. VII, p. 79.	13
		4th Report (Italy, Belgium and Holland), by Mr. C. De Benedetti.	1925, vol. VII, p. 1937.	44
X	The eight-hour day	1st Report (Switzerland, Italy, Spain and Portugal), by Mr. L. Velani.	1925, vol. VII, p. 1997.	46
		2nd Report (all countries, except Switzerland, Italy, Spain Portugal, America and the British Empire), by Mr. Soulez.	1925, vol. VII, p. 1735.	43
		3rd Report (America and the British Empire), by Mr. W. Clower.	1925, vol. VII, p. 1481.	38
XI	Statistics	1st Report (all countries, except America), by Mr. A. E. Kirkus.	1924, vol. VI, p. 947.	6
		2nd Report (America), by Colonel J. T. Loree.	1925, vol. VII, p. 1465.	37
XII	Joint stations and lines . . .	1st Report (France), by Messrs. Collot and Bruneau.	1925, vol. VII, p. 119.	14

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
XII (*continued*)	Joint stations and lines . . . (*continued*).	2nd Report (all countries, except America, the British Empire, France, China and Japan), by Mr. U. Lamalle.	1925, vol. VII, p. 571.	22
		3e Report (America and the British Empire), by Mr. R. Cope.	1925, vol. VII, p. 140.	14
		4th Report (China and Japan), by Mr. J. Murai.	1925, vol. VII, p. 151.	14
XIII	Establishment of light railways.	1st Report (America and the British Empire), by Mr. H. Marriott.	1924, vol. VI, p. 847.	3
		2nd Report (all countries, except America, the British Empire, China and Japan), by Mr. Bonneau.	1924, vol. VI, p. 873.	3
XIV	Concessions for light railways.	Report, by Messrs. P. Biraghi and P. Lo Balbo.	1925, vol. VII, p. 951.	31
XV	Traction for light railways.	1st Report (America and British Empire), by Brigadier-General H. O. Mance.	1924, vol. VI, p. 1007.	7
		2nd Report (other countries), by Mr. De Croës.	1925, vol. VII, p. 993.	32

B. — As issued.

NUMBER of the separate issue.	NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.
1	II	Breaking of rails. Joints	1st Report (America), by Mr. W.C. Cushing.
2	III	Shunting yards	2nd Report (America), by Mr. S. T. Wagner.
3	XIII	Establishment of light railways . .	1st Report (America and the British Empire), by Mr. H. Marriott.
			2nd Report (all countries, except America, the British Empire, China and Japan), by Mr. Bonneau.
4 (see also No. 2)	III	Shunting yards	3rd Report (British Empire), by Mr. R. H. Nicholls.
5	IX	Fixed Signals	1st Report (America), by Mr. W. H. Elliott.
6	XI	Statistics	1st Report (all countries, except America), by Mr. A. E. Kirkus.
7	XV	Traction for light railways	1st Report (America and the British Empire), by Brigadier General H. O. Mance.
8	IV (Litt. *A*)	Reduction of the cost of traction: fuel and its combustion.	1st Report (America), by Mr. G. H. Emerson.
9	IV (Litt. *B*)	Reduction of the cost of traction: lubrication of axleboxes for all rolling stock.	1st Report (America), by Mr. G. H. Emerson.
10	I (Litt. *A*)	Maintenance of the track	2nd Report (America), by Mr. G. J. Ray.
11	I (Litt. *B*)	Level crossings (public roads) . . .	3rd Report (America), by Mr. G. J. Ray.
12	VIII	Suburban services	1st Report (America and the British Empire), by Messrs. E. C. Cox and A. R. Cooper.
13 (see also No. 5)	IX	Fixed signals	3rd Report (British Empire), by Mr. W. J. Thorrowgood.

NUMBER of the separate issue.	NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.
14	XII	Joint stations and lines	1st Report (France), by Messrs. Collot and Bruneau. 3rd Report (America and the British Empire), by Mr. R. Cope. 4th Report (China and Japan), by Mr. J. Murai.
15	V	Electric locomotives	1st Report (America), by Mr. J. T. Wallis.
16 (see also No 11)	I (Litt. *B*)	Level crossings (public roads) . . .	1st Report (all countries, except the British Empire, America, France, Italy, Spain and Portugal), by Mr. H. P. Maas-Geesteranus.
17 (see also Nos. 2 and 4)	III	Shunting yards	1st Report (all countries, except America, Belgium, France and the British Empire), by Mr. W. Simon-Thomas.
18 (see also No. 9)	IV (Litt. *B*)	Reduction of the cost of traction: lubrication of axleboxes for all rolling stock.	3rd Report (British Empire), by Sir Henry Fowler.
19	VII	Dispatching or control systems . . .	2nd Report (British Empire), by Mr. J. H. Follows.
20 (see also Nos. 5 and 13)	IX	Fixed signals	2nd Report (all countries, except America, the British Empire, Italy, Belgium, Holland, Denmark, Sweden and Norway), by Mr. Laigle.
21	VI	Locomotive sheds	1st Report (British Empire), by Mr. R. E. L. Maunsell.
22 (see also No. 14)	XII	Joint stations and lines	2nd Report (all countries, except America, the British Empire, France, China and Japan), by Mr. U. Lamalle.
23 (see also No. 12)	VIII	Suburban services	2nd Report (all countries, except America and the British Empire), by Mr. Direz.
24 (see also No. 19)	VII	Dispatching or control systems . . .	1st Report (all countries, except America and the British Empire), by Mr. E. Epinay.
25 (see also No. 10)	I (Litt. *A*)	Maintenance of the track	4th Report (British Empire), by Mr. W. H. Coomber.

NUMBER of the separate issue.	NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.
26 (see also Nos. 10 and 25)	I (Litt. *A*)	Maintenance of the track	1st Report (France), by Mr. R. Ruffieux.
27 (see also Nos. 11 and 16)	I (Litt. *B*)	Level crossings (public roads) . . .	2nd Report (France), by Mr. R. Ruffieux.
28 (see also No. 21)	VI	Locomotive sheds	3rd Report (America), by Mr. R. W. Bell.
29 (see also No. 8)	IV (Litt. *A*)	Reduction of the cost of traction : fuel and its combustion.	2nd Report (British Empire), by Mr. C. B. Collett.
30 (see also Nos. 9 and 18)	IV (Litt. *B*)	Reduction of the cost of traction : lubrication of axleboxes for all rolling stock.	2nd Report (all countries, except America and the British Empire), by Mr. Tête.
31	XIV	Concessions for light railways . . .	Report by Messrs. P. Biraghi and P. Lo Balbo.
32 (see also No. 7)	XV	Traction for light railways	2nd Report (all countries, except America and the British Empire), by Mr. De Croës.
33 (see also No. 15)	V	Electric locomotives	2nd Report (all countries, except America), by Mr. M. Weiss.
34 (see also Nos. 19 and 24)	VII	Dispatching or control systems . . .	3rd Report (America), by Mr. F. P. Patenall.
35 (See also no. 1)	II	Breaking of rails. Joints	2nd Report (British Empire), by Mr. C. J. Brown. 3rd Report (France), by Messrs. Merklen and Cambournac. 4th Report (all countries, except the British Empire, France and America), by Mr. J. Willem.
36 (See also Nos 2, 4 and 17)	III	Shunting yards	4th Report (France and Belgium), by Messrs. Moutier and Pellarin.
37 (See also No. 6)	XI	Statistics	2nd Report (America), by Mr. J. T. Loree.
38	X	The eight-hour day	3rd Report (America and the British Empire), by Mr. W. Clower.

NUMBER of the separate issue.	NUMBER of the question	TITLE OF THE QUESTION.	DOCUMENTS.
39 (See also Nos. **21** and **28**)	VI	Locomotive sheds	2nd Report (all countries, except America and the British Empire), by Mr. G. Forte.
40 (See also Nos. **2**, **4**, **17** and **36**)	III	Shunting yards	Supplement to report n° 2 (America), by Mr. S. T. Wagner.
41 (See also Nos. **11**, **16** and **27**)	I (Litt. *B*)	Level crossings (public roads) . . .	4th Report (Italy, Spain and Portugal), by Mr. D. Mendizabal.
42 (See also Nos. **10**, **25** and **26**)	I (Litt. *A*)	Maintenance of the track	3rd Report (all countries, except the British Empire, America and France), by Mr. H. Deyl.
43 (See also No. **38**)	X	The eight-hour day	2nd Report (all countries, except America, the British Empire, Switzerland, Italy, Spain and Portugal), by Mr. Soulez.
44 (See also Nos. **5**, **13** and **20**)	IX	Fixed signals	4th Report (Italy, Belgium and Holland), by Mr. C. De Benedetti.
45 (See also Nos. **8** and **29**)	IV (Litt. *A*)	Reduction of the cost of traction : fuel and its combustion.	3rd Report (all countries, except America and the British Empire), by Mr. H. Chenu.
46 (See also Nos. **38** and **43**)	X	The eigth-hour day	1st Report (Switzerland, Italy, Spain and Portugal), by Mr. L. Velani.

PROGRAMME OF EVENTS

Monday 22 June.

At 11 a. m. — Meeting of the Permanent Commission.

At 12.15 a. m. — Reception of the delegates by the Permanent Commission.

At 3 p. m. — Formal opening of the session honoured by the presence of H. R. H. The Duke of York. After the opening, a wreath was placed on the Cenotaph in Whitehall, in memory of members of the British Forces who fell in the great war.

Tuesday 23 June.

At 9.30 a. m. — Meeting of the various sections under the provisional chairmanship of a member of the Permanent Commission to appoint sectional officials.

At 10 a. m. and 2.30 p. m. — Sectional meetings.

Wednesday 24 June.

At 9.30 a. m. — Sectional meetings.

Afternoon. — Excursion No. 1. — London to the Great Western Railway Company's Locomotive Works, Swindon.

Excursion No. 2. — London to Canterbury.

Excursion No. 2*a*. — London to Oxford.

Excursion No. 3. — Round City and West End of London. (Given by Messrs. Thomas Cook & Son.)

Thursday 25 June.

At 9 30 a. m. — Sectional meetings.

At 7.30 p. m. — Banquet at the Crystal Palace, given by the British Railway Companies.

Friday 26 June.

At 9.30 a. m. and 2.30 p. m. — Sectional meetings.

At 8 p. m. — Concert at Queen's Hall, given by the London & North Eastern Railway Company.

Saturday 27 June.

At 9.30 a. m. — General meeting.

Afternoon. — Excursion No. 4. — London to Windsor Castle.

Sunday 28 June.

Afternoon. — Excursion No. 5 (motor). — Into country via Guildford.

Excursion No. 6 (motor). — Into country via Dorking.

Excursion No. 6*a* (motor). — To Thames valley via Beaconsfield, Maidenhead and Hampton Court.

Excursion No. 6*b*. — London to Brighton.

Monday 29 June.

At 9.30 a. m. — Sectional meetings.

Afternoon. — Excursion No. 7. — London to the Great Western Railway Company's Locomotive Works, Swindon.

Excursion No. 8. — London to Canterbury.

Excursion No. 8*a*. — London to Oxford.

Excursion No. 9. — Round City and West End of London. (Given by Messrs. Thomas Cook & Son.)

Excursion No. 10 (motor). — Into country via Guildford.

Excursion No. 11 (motor). — Into country via Dorking.

Tuesday 30 June.

At 9.30 a. m. and 2.30 p m. — Sectional meetings.

At 8.30 p. m. — Official reception by His Majesty's Government at Lancaster House.

Wednesday 1 July.

At 9.30 a. m. — Sectional meetings.

At 3 p. m. — General meeting and formal closing of the session.

Thursday 2 July.

Excursion No. 12. — London to Harrogate and Leeds.

At Harrogate, concert in the Royal Hall (invitation of His Worship the Mayor and Corporation of Harrogate).

Friday 3 July.

Excursion No. 13. — Leeds and Harrogate to Darlington.

At Darlington : Centenary celebrations of the first railway opened to public traffic.

At 1.30 p. m. — Luncheon given to delegates by the London & North Eastern Railway Company.

Excursion No. 14. — Darlington to Edinburgh and Glasgow.

Excursion No. 15. — Darlington to London.

Saturday 4 July.

Excursion No. 16. — From Edinburgh and Glasgow to Kyles of Bute.

Excursion No. 17. — From Edinburgh and Glasgow round the Trossachs.

Sunday 5 July.

Excursion No. 18. — Glasgow and Edinburgh to London.

Excursion No. 19. — Glasgow and Edinburgh to Gleneagles and back.

Excursion No. 20. — Edinburgh and Glasgow to Turnberry and back.

Monday 6 July

Excursion No. 21. — Glasgow and Edinburgh to London.

Tuesday 7 July.

Excursion No. 22. — London to Toton sidings and the London Midland & Scottish Railway Company's carriage and wagon works, Derby, and to the Peak district.

GENERAL LIST OF DELEGATES

N. B. — An asterisk (*) means that a delegate is already a member of the Congress in some other capacity, this latter being inserted in brackets. Members so marked are not included in the number allowed to their Company.

◆ = Present at London.

I. — Delegates of the Permanent Commission.

A. — Permanent Commission.

President :

◆ E. **Foulon,** administrateur-directeur général des chemins de fer de l'Etat belge.

Vice-presidents :

◆ C. **Colson,** membre de l'Institut, inspecteur général des ponts et chaussées, vice-président du Conseil d'Etat de France;

◆ S. **Marchal,** administrateur des chemins de fer de l'Etat belge.

Ex-President of session, ex-officio member :

R. **de Cornè,** ingénieur, président du conseil supérieur des travaux publics d'Italie.

Members :

R. H. **Aishton,** president, American Railway Association;

◆ T. A. **Alstrup,** directeur général des chemins de fer de l'Etat danois;

W. W. **Atterbury,** vice-president, Pennsylvania Railroad System;

◆ L. M. **Barnet Lyon,** ingénieur civil, membre du conseil de surveillance des chemins de fer néerlandais;

◆ G. **Behrens,** director, London Midland & Scottish Railway;

◆ Sir Ernest Albert Seymour **Bell,** Kt., C. I. E., Government director of the Indian Railway Companies;

◆ A. **Braem,** administrateur des chemins de fer de l'Etat belge;

◆ J. R. **Brooke,** C. B., permanent secretary, Ministry of Transport (Great Britain);

◆ The Right Hon. H. G. **Burgess,** general manager, London Midland and Scottish Railway;

◆ The Right Hon. Sir Evelyn **Cecil,** G. B. E., M. P., privy councillor, director, Southern Railway (Great Britain);

◆ E. **du Castel,** conseiller d'Etat, directeur général honoraire des chemins de fer au Ministère des travaux publics de France;

◆ H. **Caufriez,** directeur général de la Société nationale belge des chemins de fer vicinaux;

◆ The Right Hon. Viscount **Churchill,** G. C. V. O., chairman, Great Western Railway;

◆ Sir Francis **Dent,** C. V. O., director, Southern Railway (Great Britain);

◆ A. **Fabris,** ingénieur, chef du service du matériel et de la traction des chemins de fer de l'Etat italien;

◆ F. **Fiori,** ingénieur, chef de service principal des chemins de fer de l'Etat italien;

◆ M. **Fontaneilles,** inspecteur général des ponts et chaussées, président de la section des chemins de fer au conseil général des ponts et chaussées de France;

◆ Sir Henry **Fowler,** K. B. E., deputy chief mechanical engineer, London Midland & Scottish Railway;

A. **Frank,** ingénieur des ponts et chaussées, inspecteur au Ministère des chemins de fer de Pologne;

◆ P. **Ghilain,** ingénieur en chef inspecteur de direction aux chemins de fer de l'Etat belge, président de la Commission de réception du matériel et des approvisionnements;

◆ R. **Gioppo,** ingénieur, inspecteur supérieur à la Direction générale des chemins de fer de l'Etat italien;

◆ Sir Guy **Granet,** G. B. E., chairman, London Midland & Scottish Railway;

◆ A. **Granholm,** directeur général des chemins de fer de l'Etat suédois;

Griolet, vice-président du conseil d'administration de la Compagnie du chemin de fer du Nord français;

◆ Dr. R. **Herold,** directeur au département fédéral des postes et des chemins de fer suisses;

◆ K. **Ikeda,** delegate of the Japanese Government Railways;

Jacques, administrateur des chemins de fer de l'Etat belge;

◆ P. E. **Javary,** directeur de l'exploitation de la Compagnie du chemin de fer du Nord français;

E. **Kejr,** ingénieur, conseiller des constructions du département V/1 au Ministère des chemins de fer de Tchécoslovaquie;

◆ G. **Kunz,** directeur du chemin de fer Berne-Loetschberg-Simplon;

◆ U. **Lamalle,** administrateur des chemins de fer de l'Etat belge;

L. F. **Loree**, president, Delaware & Hudson Railroad;

A. **Mange**, directeur de la Compagnie du chemin de er de Paris à Orléans;

Margot, directeur général de la Compagnie des che- nins de fer de Paris à Lyon et à la Méditerranée;

Maristany, marquis de l'Argentera, directeur général le la Compagnie des chemins de fer de Madrid à Sara- gosse et à Alicante;

C. **Mereutza**, sous-directeur général des chemins de er roumains;

Molle, administrateur des chemins de fer de l'Etat elge;

J. R. **Paul**, directeur de la Compagnie des chemins de er du Midi français;

G. **Philippe**, inspecteur général des lignes Nord elges;

P. **Riboud**, directeur de la Compagnie des chemins de er de l'Est français;

Abdul Hamid Pacha **Soliman**, directeur général des hemins de fer, télégraphes et téléphones de l'Etat gyptien;

F. **Tajani**, ingénieur, président de la Fédération des ransports d'Italie;

Sir Henry W. **Thornton**, chairman of the board of irectors and president, Canadian National Railways;

Tsang Ou, directeur général adjoint du chemin de fer u Lunghai;

A. **Valenciano y Mazerès**, ingénieur en chef des ponts t chaussées, sous-directeur général des travaux publics t chef de la section des chemins de fer au Ministère u fomento d'Espagne;

D. **Willard**, chairman of the board, American Railway ssociation, president, Baltimore & Ohio Railroad;

Zingg, président de la direction générale des chemins e fer fédéraux suisses.

Administrative councillor :

A. **Braem***.

General Secretary :

P. **Ghilain***.

Assistant Secretaries :

R. **Desprets**, ingénieur incipal aux chemins fer de l'Etat belge;

E. **Minsart**, ingénieur incipal aux chemins de r de l'Etat belge, chef cabinet de M. le Mi stre des chemins de r, marine, postes et légraphes;

J. **Van Rijn**, ingénieur incipal aux chemins de r de l'Etat belge.

Secretary-treasurer :

◆ E. **Holemans**, inspecteur de direction honoraire aux chemins de fer de l'Etat belge.

Assistant Secretary-treasurer :

◆ J. **Habran**, directeur d'administration honoraire aux chemins de fer de l'Etat belge;

Chief clerks :

◆ E. **Nollet**;

◆ E. **Heremans**.

B. — English section of the Permanent Commission (Local organising Committee).

President :

◆ The Right Hon. Viscount **Churchill***, G. C. V. O., chairman, Great Western Railway (member of the Permanent Commission).

Vice-presidents :

◆ The Right Hon. Sir Evelyn **Cecil***, G. B. E., M. P., privy councillor, director, Southern Railway (member of the Permanent Commission);

◆ **Behrens***, director, London Midland & Scottish Railway (ditto).

Members :

◆ The Right Hon. Lieut.-Col. Wilfred **Ashley**, M. P., Minister of Transport;

◆ The Right Hon. Lord **Aberconway**, P. C., chairman, Metropolitan Railway;

◆ A. W. **Allen**, mineral manager, London Midland & Scottish Railway;

◆ The Right Hon. Lord **Ashfield**, P. C., chairman & managing director, Metropolitan District Railway;

◆ Brig.-General The Hon. Everard **Baring**, C. V. O., C. B. E., chairman, Southern Railway;

◆ F. A. **Brant**, continental traffic assistant, Southern Railway;

◆ J. R. **Brooke***, C. B., permanent secretary, Ministry of Transport (member of the Permanent Commission);

◆ The Right Hon. H. G. **Burgess***, general manager, London Midland & Scottish Railway (ditto);

O. R. H. **Bury**, director, Cheshire Lines Committee.

◆ The Hon. Eric Brand **Butler-Henderson**, director, Great Central & Midland Joint Committee;

◆ C. **Byrom**, O. B. E., assistant chief general superintendent, London Midland & Scottish Railway;

◆ W. **Clow**, C. B. E., superintendent (Southern Area), London & North Eastern Railway;

◆ A. **Davies**, M. B. E., general superintendent (passenger commercial), London Midland & Scottish Railway;

◆ D. **Davies**, M. P., director, Great Western Railway;

◆ Sir Francis **Dent***, C. V. O., director, Southern Railway (member of the Permanent Commission);

◆ C. L. **Edwards**, C. B. E., chief accountant, London & North Eastern Railway;

◆ Sir William **Forbes**, late joint general manager, Southern Railway;

◆ Sir Henry **Fowler***, K. B. E., deputy chief mechanical engineer, London Midland & Scottish Railway (member of the Permanent Commission);

◆ W. A. **Fraser**, engineer (Southern Scottish Area), London & North Eastern Railway;

◆ A. L. **Gibson**, continental traffic manager (South), London & North Eastern Railway;

◆ Sir Guy **Granet***, G. B. E., chairman, London Midland & Scottish Railway (member of the Permanent Commission);

◆ T. **Hornsby**, goods manager (North Eastern Area), London & North Eastern Railway;

◆ A. G. **Hubbard**, solicitor, Great Western Railway;

◆ S. H. **Hunt**, C. B. E., chief goods manager, London Midland & Scottish Railway;

◆ The Right Hon. Viscount **Inchcape**, G. C. M. G., director, Great Western Railway;

◆ R. J. **Insell**, signal engineer, Great Western Railway;

◆ J. B. **Ismay**, director, London Midland & Scottish Railway;

◆ J. A. **Kay**, agent, Great Western Railway;

◆ C. **Ker**, C. A., director, London Midland & Scottish Railway;

◆ The Right Hon. Lord **Lawrence of Kingsgate**, director, London Midland & Scottish Railway;

◆ W. G. P. **Maclure**, locomotive running superintendent (Southern Area), London & North Eastern Railway;

◆ G. **Marshall**, goods manager (Southern Area), London & North Eastern Railway;

◆ J. F. **Mason**, director, Great Western Railway;

◆ A. **Maynard**, assistant chief goods manager and development agent, Great Western Railway;

◆ H. V. **Mosley**, assistant to general manager, London Midland & Scottish Railway;

◆ F. **Pick**, assistant managing director, Underground Electric Railways Company of London;

◆ Sir Felix **Pole**, general manager, Great Western Railway;

◆ J. **Quirey**, accountant general, London Midland & Scottish Railway;

◆ R. W. **Reid**, C. B. E., carriage and wagon superintendent, London Midland & Scottish Railway;

Sir Thomas **Royden**, Bt., C. H., director, London Midland & Scottish Railway;

◆ C. J. **Selway**, C. B. E., passenger manager (Southern Area), London & North Eastern Railway;

◆ J. H. **Smeddle**, O. B. E., locomotive running superintendent (North Eastern Area), London & North Eastern Railway;

◆ R. **Smith**, electrical engineer;

◆ H. H. **Spiller**, agent, Great Western Railway;

F. L. **Steel**, director, Midland & Great Northern Railways Joint Committee.

◆ M. S. **Strang**, M. B. E., passenger manager (Southern Scottish Area), London & North Eastern Railway;

◆ F. **Tatlow**, director, Cheshire Lines Committee;

◆ H. L. **Thornhill**, solicitor, London Midland & Scottish Railway;

◆ Sir Herbert A. **Walker**, K. C. B., general manager, Southern Railway;

◆ H. A. **Watson**, M. V. O., C. B. E., consultant, London & North Eastern Railway;

◆ Sir Ralph Lewis **Wedgwood**, C. B., C. M. G., chief general manager, London & North Eastern Railway;

◆ Wm. **Whitelaw**, chairman, London & North Eastern Railway.

Secretaries :

◆ Arthur B. **Cane**, C. B. E., secretary, Railway Companies' Association;

◆ H. **Marriott**, C. B. E., former assistant to general manager, London Midland & Scottish Railway.

Arrangements Committee.

President :

◆ Sir Evelyn **Cecil***, G.B.E., M. P.

Members :

◆ G. **Behrens***;

◆ Sir Felix **Pole***;

◆ Sir Ralph Lewis **Wedgwood***, C. B., C. M. G.

◆ The Right Hon. H. G. **Burgess***;

◆ Sir Herbert A. **Walker***, K. C. B.;

◆ F. A. **Brant***;

◆ A. L. **Gibson***;

◆ Sir Henry **Fowler***, K. B. E.;

◆ A. **Maynard***.

Sub-Committee of Arrangements Committee.

◆ F. A. **Brant***;

◆ A. L. **Gibson***;

◆ Sir Henry **Fowler***, K. B. E.;

◆ A. **Maynard***;

◆ H. **Marriott***, C. B. E.

C. — REPORTERS OF THE QUESTIONS SUBMITTED TO THE CONGRESS.

◆ R. W. **Bell**, general superintendent motive power, Illinois Central Railroad;

P. **Biraghi**, ingénieur, administrateur-délégué du chemin de fer Corleone-San Carlo;

Bonneau, ingénieur en chef des ponts et chaussées, ancien inspecteur général des travaux publics de l'Indochine;

◆ C. J. **Brown**, chief engineer (Southern Area), London & North Eastern Railway;

◆ **Bruneau**, ingénieur en chef du service central de l'exploitation de la Compagnie des chemins de fer du Midi français;

◆ **Cambournac**, ingénieur en chef des études, matériel des voies et bâtiments de la Compagnie du chemin de fer du Nord français;

◆ **Chenu**, ingénieur en chef, inspecteur de direction aux chemins de fer de l'Etat belge;

◆ W. **Clower**, assistant to general manager, staff and labour, London Midland & Scottish Railway;

◆ C. B. **Collett**, chief mechanical engineer, Great Western Railway;

◆ **Collot**, ingénieur en chef adjoint de l'exploitation de la Compagnie des chemins de fer de l'Est français;

◆ W. H. **Coomber**, divisional engineer (permanent way), London Midland & Scottish Railway;

◆ A. R. **Cooper,** chief engineer, Metropolitan District Railway;

◆ R. **Cope,** chief accountant, Great Western Railway;

◆ E. C. **Cox,** C. B. E., chief operating superintendent, Southern Railway (Great Britain);

◆ W. C. **Cushing,** engineer of standards, Pennsylvania Railroad System;

◆ C. **De Benedetti,** ingénieur en chef du service des voies et travaux des chemins de fer de l'Etat italien;

◆ **De Croës,** ingénieur en chef, directeur du service de la traction et du matériel de la Société nationale belge des chemins de fer vicinaux;

◆ H. **Deyl,** ingénieur, conseiller ministériel au Ministère des chemins de fer de l'Etat tchécoslovaque;

◆ **Direz,** sous-chef de l'exploitation des chemins de fer de l'Etat français;

W. H. **Elliott,** signal engineer, New York Central Railroad;

G. H. **Emerson,** chief of motive power and equipment, Baltimore & Ohio Railroad;

◆ E. **Epinay,** ingénieur en chef adjoint au chef de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans;

◆ J. H. **Follows,** chief general superintendent, London Midland & Scottish Railway;

◆ G. **Forte,** ingénieur, inspecteur chef supérieur au service de la traction et du matériel des chemins de fer de l'Etat italien;

◆ Sir Henry **Fowler***, K. B. E., deputy chief mechanical engineer, London Midland and Scottish Railway (member of the Permanent Commission and of the English Section of that Commission);

◆ A. E. **Kirkus,** director of statistics, Ministry of Transport (Great Britain);

◆ **Laigle,** ingénieur en chef adjoint à l'ingénieur en chef de la voie de la Compagnie des chemins de fer du Midi français;

◆ U. **Lamalle***, administrateur des chemins de fer de l'Etat belge (member of the Permanent Commission);

◆ Dr. P. **Lo Balbo,** directeur de la Compagnie des tramways à vapeur piémontais;

◆ Colonel J. T. **Loree,** vice-president and general manager, Delaware & Hudson Company;

◆ **Maas Geesteranus,** ingénieur en chef, chef du service des voies et travaux des chemins de fer néerlandais;

◆ Brigadier General H. O. **Mance,** C. B., C. M. G., D. S. O., R. E., late director of railways (Light Railways and Roads), War Office (Great Britain);

◆ H. **Marriott***, C. B. E., late assistant to general manager, London Midland & Scottish Railway (Secretary of the English section of the Permanent Commission);

◆ R. E. L. **Maunsell,** chief mechanical engineer, Southern Railway (Great Britain);

◆ D. **Mendizabal,** ingénieur en chef de la division du matériel fixe de la Compagnie du chemin de fer de Madrid à Saragosse et à Alicante;

◆ **Merklen,** ingénieur en chef de la voie et des bâtiments des chemins de fer d'Alsace et de Lorraine;

◆ **Moutier,** ingénieur en chef des services techniques de l'exploitation de la Compagnie du chemin de fer du Nord français;

J. **Murai,** directeur des services commerciaux des chemins de fer de l'Etat japonais;

◆ R. H. **Nicholls,** superintendent of the line, Great Western Railway;

F. P. **Patenall,** signal engineer, Baltimore & Ohio Railroad;

◆ **Pellarin,** ingénieur en chef adjoint à l'ingénieur en chef de l'exploitation de la Compagnie des chemins de fer de l'Est français;

◆ G. J. **Ray,** chief engineer, Delaware, Lackawanna & Western Railroad;

◆ R. **Ruffieux,** ingénieur en chef au service central de la voie de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée;

◆ W. **Simon-Thomas,** ingénieur, chef de division au service de l'exploitation des chemins de fer néerlandais;

◆ **Soulez,** ingénieur en chef attaché à la direction de l'exploitation du chemin de fer du Nord français;

◆ **Tête,** ingénieur principal de la 2e division du matériel de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée;

◆ W. J. **Thorrowgood,** signal and telegraph superintendent, Southern Railway (Great Britain);

◆ L. **Velani,** ingénieur, vice-directeur général des chemins de fer de l'Etat italien;

◆ S. T. **Wagner,** chief engineer, Reading Company;

◆ J. T. **Wallis,** chief of motive power, Pennsylvania Railroad System;

◆ M. **Weiss,** ingénieur en chef de la traction à la direction générale des chemins de fer fédéraux suisses;

◆ J. **Willem,** inspecteur général, président de la commission de réception du matériel de la voie des chemins de fer de l'Etat belge.

D. — Principal Secretaries.

◆ **Belpaire,** ingénieur en chef-directeur de la Société nationale belge des chemins de fer vicinaux;

◆ R. **Desprets***;

◆ E. **Minsart***;

◆ **Santini,** ingénieur du service des approvisionnements de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée;

◆ J. **Van Rijn***.

E. — Section Secretaries.

◆ G. H. L. **Allen,** chief goods managers' Department, London Midland & Scottish Railway;

◆ O. **Bulleid,** London & North Eastern Railway;

◆ **Cérès,** représentant de la Compagnie du chemin de fer de Paris à Orléans;

◆ H. **Chambers,** London Midland & Scottish Railway;

◆ **Chevalier,** contrôleur de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans;

◆ **Cottier,** secrétaire général des Chemins de fer fédéraux suisses;

◆ **Depoorter,** ingénieur en chef-directeur de service aux chemins de fer de l'Etat belge;

◆ F. **Engel,** London Midland & Scottish Railway;

◆ W. H. **Harper,** London Midland & Scottish Railway;

◆ H. C. **King Stephens,** Southern Railway (Great Britain);

◆ E. **Livesey,** Southern Railway (Great Britain);

◆ L. H. K. **Neil,** London & North Eastern Railway;

◆ A. **Newbold,** Southern Railway (Great Britain);

◆ T. H. **Richardson,** Engineering Department, London Midland & Scottish Railway;

◆ L. W. R. **Robertson;**

◆ **Roche,** C. E.;

◆ E. **Vanni,** ingénieur, inspecteur principal à la direction générale des chemins de fer de l'Etat italien;

◆ Dr. **Velleman.**

II — Members appointed by Governments and by Railway Administrations affiliated to the Association.

A. — Government Delegates.

Argentine.

Ministère des travaux publics.

Belgique et Colonie (Belgium & Colony).

1. — BELGIUM.

Ministère des chemins de fer, marine, postes et télégraphes :

Permanent Commission of the Association :

◆ E. **Foulon***, administrateur-directeur général des chemins de fer de l'Etat (president of the Permanent Commission);

◆ A. **Braem***, administrateur des chemins de fer de l'Etat (member of the Permanent Commission);

◆ S. **Marchal***, administrateur des chemins de fer de l'Etat (vice-president of the Permanent Commission);

◆ U. **Lamalle***, administrateur des chemins de fer de l'Etat (member of the Permanent Commission and reporter).

Reporters :

◆ J. **Willem***, inspecteur général des chemins de fer de l'Etat;

◆ **Chenu***, ingénieur en chef, inspecteur de direction des chemins de fer de l'Etat.

Other delegates :

General Secretary :

◆ J. **Colens,** secrétaire général.

Administration des chemins de fer de l'Etat :

◆ **Gaeremynck,** ingénieur en chef, directeur d'administration;

◆ **Defrance,** délégué officiel du Département des chemins de fer à Londres.

2. — COLONY.

Ministère des colonies :

◆ **Van Leeuw,** ingénieur en chef, chef de service des travaux publics et voies de communication.

Bolivie (Bolivia).

Ministère des travaux publics.

Brésil (Brazil).

Ministère de l'industrie, des communications et des travaux publics :

◆ Dr. Aarão **Reis,** ingénieur, professeur à l'Université de Rio-de-Janeiro.

Chili.

Ministère des voies et communications :

A. **Salazar,** professeur d'électricité à l'Université du Chili à Santiago;

◆ M. **Salinas,** chargé d'affaires du Chili à Londres;

L. **Waddington,** conseiller financier de la légation du Chili à Londres;

A. **Bertrand,** conseiller commercial de la légation du Chili en France;

◆ V. **Echeverria,** consul du Chili à Londres.

Chine (China).

Ministère des communications :

◆ Dr. C. C. **Wang,** C. E., Ph. D., conseiller supérieur du Ministère des communications, ex-président des chemins de fer de l'Est chinois, premier président de la Commission pour l'unification de la comptabilité et de la statistique des chemins de fer, directeur général des chemins de fer de l'Etat chinois;

◆ Dr. S. **Tchéou Weï,** ingénieur des ponts et chaussées, secrétaire général et conseiller technique de la délégation de la République de Chine auprès de la Société des Nations;

◆ F. H. **Clark,** conseiller technique du Ministère des communications;

◆ O. F. A. **Sandberg,** ingénieur-conseil des chemins de fer de l'Etat chinois;

◆ D. P. **Ricketts,** ingénieur-conseil du chemin de fer Pékin-Mukden.

Danemark (Denmark).

Ministère des travaux publics :

◆ T. A. **Alstrup***, directeur général des chemins de fer de l'Etat (member of the Permanent Commission);
◆ Son Exc. J. F. N. **Friis-Skotte**, ministre des travaux publics;
◆ H. L. **Helweg**, directeur du contrôle des chemins de fer privés;
◆ B. K. **Ollgaard**, chef de section;
◆ E. **Lunn**, chef de section.

Dominicaine (République) Dominican (Republic).

Ministère des travaux publics.

Egypte (Egypt).

Ministère des communications :

◆ Abdul Hamid Pacha **Soliman***, directeur général des chemins de fer de l'Etat (member of the Permanent Commission);
◆ J. C. **Serjeant**, ingénieur en chef du service de la voie des chemins de fer de l'Etat.

Equateur (République de l'). (Ecuador Republic).

Ministère des travaux publics.

Espagne (Spain).

Ministère du fomento :

◆ J. **Fuster y Tomas**, ingénieur en chef de 1re classe des ponts et chaussées, chef des études de construction des chemins de fer du Nord-Est de l'Espagne;
◆ J. **Gil Clemente**, lieutenant colonel du génie, membre du conseil supérieur des chemins de fer du Royaume.

Etats-Unis d'Amérique. (United States of America).

Department of State :

H. C. **Hall**, chairman of the Interstate Commerce Commission;
◆ Col. E. A. **Simmons**, president, Simmons-Boardman Publishing Company;
◆ D. F. **Crawford**, vice-president of the Locomotive Stoker Company;
◆ A. L. **Humphrey**, president of the Westinghouse Air Brake Company;
◆ W. F. **Schleiter**, vice-president of Dilworth Porter & Company;
◆ H. A. **Smith**, president of the *Railway Review*;
F. W. **Noxon**, secretary of the Railway Business Association;
◆ C. H. **Muchnic**, vice-president of the American Locomotive Sales Corporation;
◆ T. C. **McBride**, manager, Locomotive Heater Department of the Worthington Pump & Machinery Corporation;
◆ B. M. **Robinson**, president of the American Short Line Railway Association;

Finlande (Finland).

Ministère des communications et des travaux publics :

◆ O. **Donner**, ministre de Finlande en Grande-Bretagne.

France and Colonies.

A. — FRANCE.

Ministère des travaux publics :

◆ **Colson***, membre de l'Institut, vice-président du conseil d'Etat, inspecteur général des ponts et chaussées (vice-president of the Permanent Commission);

◆ T. **Tissier**, président de section au conseil d'Etat;

◆ **Fontaneilles***, inspecteur général des ponts et chaussées, président de section au conseil général des ponts et chaussées (member of the Permanent Commission);

◆ **du Castel***, ingénieur en chef des ponts et chaussées, ancien directeur général des chemins de fer au Ministère des travaux publics (ditto);

◆ **Chardon**, conseiller d'Etat;

◆ **Schwob**, conseiller d'Etat, directeur général des chemins de fer au Ministère des travaux publics;

Legrain, inspecteur général des ponts et chaussées, directeur de l'école nationale des ponts et chaussées;

◆ **Maison**, inspecteur général des mines, directeur du contrôle de l'exploitation technique des chemins de fer français;

◆ **Rivet**, inspecteur général des mines, directeur du contrôle du matériel et de la traction des chemins de fer français;

◆ **Claise**, inspecteur général des ponts et chaussées, directeur du contrôle des travaux des lignes nouvelles et de la voie et des bâtiments;

◆ **de Ruffi de Pontevès**, inspecteur général des mines, directeur du contrôle du travail des agents de chemins de fer;

Mahieu, sénateur, président du conseil supérieur des chemins de fer au Ministère des travaux publics;

Joyant, ingénieur en chef des ponts et chaussées, attaché à la direction générale des chemins de fer au Ministère des travaux publics.

B. — COLONIES.

Tunisie (Tunis).

Direction générale des travaux publics :

Mourgnot, directeur général des travaux publics;

◆ **Favière**, ingénieur en chef des ponts et chaussées, directeur général-adjoint des travaux publics, directeur du contrôle des chemins de fer.

Grande-Bretagne, Inde, Dominions, Protectorats et Colonies. (Great Britain, India, Dominions, Protectorates and Colonies.)

A. — Grande-Bretagne (Great Britain).

Ministry of Transport :

◆ The Right Hon. Lieut.-Col. Wilfred **Ashley***, M. P., Minister of Transport (member of the English Section of the Permanent Commission);
◆ C. W. **Hurcomb**, C. B., C. B. E., assistant secretary, financial and statistical department;
◆ E. W. **Rowntree**, assistant secretary, secretarial department;
◆ Colonel Sir John **Pringle**, C. B., R. E., chief inspecting officer of railways;
◆ Major G. L. **Hall**, O. B. E., R. E., inspecting officer of railways;
◆ Lieut.-Col. A. H. L. **Mount**, C. B., R. E., inspecting officer of railways;
◆ Sir Henry **Maybury**, K. C. M. G., C. B., director general of roads department.
◆ Lieut.-Col. J. T. C. **Moore-Brabazon**, M. C., M. P., parliamentary secretary.

Foreign Office :

◆ J. G. **Baldwin**, C. B.

War Office :

◆ Colonel A. S. **Redman**, C. B.

General Post Office :

◆ Brigadier general F. H. **Williamson**, C. B., C. B. E., director of postal services.

Ministry of Labour :

◆ J. A. N. **Barlow**, C. B. E., principal assistant secretary in the industrial relations department.

Crown Agents for the Colonies :

◆ J. W. **Spiller**, M. Inst. C. E., chief engineer of the Crown Agents;
◆ B. **Mott**, C. B., president of the Institution of Civil Engineers;
◆ Sir Vincent L. **Raven**, K. B. E., president of the Institution of Mechanical Engineers;
◆ W. B. **Woodhouse**, M. I. C. E., M. I. M. E., president of the Institution of Electrical Engineers;
◆ Sir Lynden L. **Macassey**, K. B. E., K. C., president of the Institute of Transport;
◆ A. W. **Gray**, secretary of the Institute of Transport;
◆ W. A. **Jepson**, member of the Railway Rates Tribunal;
◆ G. C. **Locket**, member of the Railway Rates Tribunal;
◆ H. **Gosling**, C. H., M. P.
◆ S. **Machin**, J. P., president of the Association of British Chambers of Commerce;
Col. The Honourable Vernon **Willey**, C. M. G., C. B. E., M. V. O., president of the Federation of British Industries.

B. — Inde, Dominions, Protectorats et Colonies. (India, Dominions, Protectorates and Colonies.)

Under Secretary of State for India :

◆ Sir Ernest Albert Seymour **Bell***, Kt., C. I. E., Government director of the Indian Railway Companies (member of the Permanent Commission);
◆ A. **Chase**, O. B. E., director of mechanical engineering board, Indian Railway Board.
◆ C. D. M. **Hindley**, chief commissioner of railways, Indian Railway Board;
◆ N. D. **Calder**, officiating traffic manager, Eastern Bengal Railway;
◆ B. G. **Smith**, O. B. E., district traffic superintendent, North Western Railway.

Irish Free State :

◆ J. **Ingram**, director, transport and marine branch;
◆ T. M. **Batchen**, M. Inst. C. E., inspecting officer of railways.

Agent General for New South Wales in London :

◆ J. **Davis**, M. Inst. C. E., consulting engineer in London for the New South Wales Government.

High Commissioner for the Dominion of New Zealand in London :

◆ J. **Mason**, member of the New Zealand railway board.

Colony of Nigeria.

Grèce (Greece).

Ministère des communications :

◆ K. **Pantazis**, directeur des chemins de fer;
◆ A. **Politis**, délégué du gouvernement pour les fournitures des chemins de fer de l'Etat.

Italie (Italy).

Ministère des communications :

◆ F. d'**Alessio**, avocat, député au parlement, professeur ordinaire de droit administratif à l'Université Royale de Pavie;
◆ A. **Netti**, ingénieur, député au parlement;
◆ L. **Maccallini**, ingénieur, inspecteur en chef supérieur des chemins de fer de l'Etat;
◆ G. **Semenza**, ingénieur.

Ministère des travaux publics :

◆ V. **De Benedetti**, ingénieur, inspecteur supérieur de la division de surveillance de l'inspectorat général des chemins de fer, tramways et automobiles.

Japon (Japan).

Ministère des communications :

◆ T. **Ito**, chief engineer, bureau of private railway administration;
◆ K. **Ikeda***, secretary (member of the Permanent Commission);

◆T. **Nakagawa**, secretary;
◆Y. **Kobayashi**, secretary;
◆M. **Maeda**, secretary;
◆M. **Kagayama**, civil engineer;
◆I. **Koyama**, mechanical engineer;
◆C. **Nakayama**, civil engineer;
◆S. **Tokunaga**, mechanical engineer;
◆G. **Kobayashi**, mechanical engineer;
◆H. **Minami**, electrical engineer.

Luxembourg (Luxemburg).

Direction générale des travaux publics :

A. **Lefort**, conseiller d'Etat, premier commissaire du ouvernement pour les chemins de fer.

Mexique (Mexico).

Secrétariat des communications et des travaux ublics :

◆A. **Pani**, ingénieur, consul général du Mexique, à aris;
◆B. E. **Holloway**, general manager, Mexican Railway ompany.

Norvège (Norway).

Ministère des travaux publics :

◆E. **Heiberg**, directeur général des chemins de fer de Etat.

Paraguay.

Ministère des relations extérieures.

Pays-Bas (Holland).

Ministère du waterstaat :

◆L. M. **Barnet Lyon***, ingénieur civil, ex-membre de ancien conseil de surveillance des chemins de fer néerandais (member of the Permanent Commission);
◆J. G. **Ravenek**, ingénieur supérieur de l'Etat pour les hemins de fer;
◆D. **Verhoop**, ingénieur supérieur de l'Etat pour les hemins de fer.

Pérou (Peru).

Ministère du fomento.

Pologne (Poland).

Ministère des chemins de fer :

◆J. **Eberhardt**, ingénieur, sous-secrétaire d'Etat;
◆W. **Czapski**, ingénieur, directeur du Département 'exploitation.

Portugal.

Ministère du commerce et des communications :

◆A. de Sousa **Rego**, ingénieur, directeur général des hemins de fer;
◆J. F. de **Souza**, ingénieur de la junte consultative des chemins de fer;
◆J. M. de Oliveira **Simoës**, ingénieur, directeur général du commerce et de l'industrie;
◆A. Teixeira de **Queiroz**, ingénieur de la direction générale des chemins de fer;
◆A. J. Estevan da **Silva**, ingénieur de la propriété industrielle;
◆R. da Costa **Couvreur**, ingénieur au Ministère du commerce et des communications.

Roumanie (Roumania).

Ministère des travaux publics.

Serbes, Croates et Slovènes (Royaume des). (Yougo-Slavia.)

Ministère des communications :

◆B. **Djouritchitch**, sous-directeur de la direction des chemins de fer;
◆Y. **Popovitch**, chef de section au Ministère des communications.

Siam.

Ministère des voies de communication :

◆Ch. P. **Sandberg**, consulting & inspecting engineer;
◆P. **Prakaskolasilp**, section engineer, State Railways.

Suède (Sweden).

Ministère de l'intérieur :

◆A. **Granholm***, directeur général des chemins de fer de l'Etat (member of the Permanent Commission);
I. **de Virgin**, directeur et sous-chef à l'administration des chemins de fer de l'Etat;
C. H. F. **Meurling**, directeur en chef de l'administration des ponts et chaussées;
◆L. V. **Stahle**, inspecteur de machines à l'administration des ponts et chaussées;
C. A. **Ehrlin**, inspecteur de machines, adjoint à l'administration des ponts et chaussées;
◆E. G. **Sahlin**, consul général de Suède à Londres.

Suisse (Switzerland).

Département fédéral des chemins de fer :

◆Le Dr. R. **Herold***, chef de la division des chemins de fer (member of the Permanent Commission);
◆H. **Hunziker**, ingénieur, adjoint du directeur et chef du service technique de la division des chemins de fer;
◆Ch. **Andreae**, professeur du cours de construction des routes et des chemins de fer à l'école polytechnique fédérale à Zurich.

Tchéco-Slovaquie (Czecho-Slovakia).

Ministère des chemins de fer :

◆Emile **Kabeš**, ingénieur, chef de section.

Uruguay.

Ministère des travaux publics :

Son Exc. **Vidiella,** ministre de la République de l'Uruguay à Londres;
◆ **Storm,** ingénieur;
◆ **Regusci,** ingénieur.

B. — MEMBERS APPOINTED BY RAILWAY ADMINISTRATIONS AFFILIATED TO THE ASSOCIATION.

Argentine.

I. — **State Railways.**

Etat (Chemins de fer de l') (6 151 k.).

II. — **Private Companies.**

Buenos Ayres Great Southern Railway (6 352 k. [3 947 miles]) :

◆ H. C. **Allen,** chairman;
◆ Lieut.-col. W. **Parish,** C. B. E., director;
◆ J. P. **Clarke,** C. B. E., director;
◆ Sir Sam **Fay,** director;
◆ Lieut.-col. R. Tristram **Harper,** O. B. E., F. C. A., secretary;
◆ Sir Brodie **Henderson,** K. C. M. G., C. B., consulting engineer;
◆ N. F. E. **Grey,** assistant secretary;
◆ L. J. **Boyer,** stores superintendent;
◆ T. **Loewenthal,** assistant accountant;
◆ F. W. **Orman,** divisional locomotive superintendent.

Buenos Ayres & Pacific Railway (4 202 k. [2 611 miles]).

Buenos Ayres Western Railway (3 028 k. [1 882 miles]) :

Sir Henry **Bell,** Bart., chairman;
F. Foster, general manager;
◆ Sir Harry **Livesey,** consulting engineer;
◆ Hon. P. **Henderson,** consulting engineer;
R. Graham, secretary;
J. C. Angel, assistant commercial superintendent;
A. W. **Bannatyne,** chief mechanical engineer;
A. M. **Stewart,** engineer-in-chief.

Central Argentine Railway (5 319 k. [3 305 miles]) :

◆ Ch. H. **Roberts,** chief assistant to the chief engineer;
◆ K. A. **Van Wassenaar,** principal assistant to the chief accountant and chief of revenue audit;
◆ P. **Goddard,** chief traffic controller;
◆ P. S. **Whelan,** assistant to the traffic manager;
◆ K. N. **Eckhard,** resident electrical engineer.

Cordoba Central Railway (1 934 k. [1 202 miles]) :

Lord **Farrer,** chairman;
◆ R. **Popkiss,** director;
P. **Norman,** director;
W. S. **Poole,** director;
J. H. C. **Johnston,** director.

Entre Rios Railways (1 173 k. [729 miles]) :

A. **Cook,** director;
◆ J. **Williamson,** director;
◆ B. H. **Binder,** director;
◆ G. A. **Doswell,** acting secretary.

Province de Santa-Fé (Compagnie française des chemins de fer de la) (1 911 k.) :

Desroys du Roure, administrateur;
H. **Puerari,** administrateur;
C. **Bailloud,** administrateur;
L. **Herbelot,** secrétaire général.

Rosario à Puerto Belgrano (Compagnie du chemin de fer de) (824 k.) :

R. **Beaugey,** président du conseil d'administration;
H. **Chabert,** administrateur;
R. R. **de Tilly,** secrétaire général.

Belgique et Colonie (Belgium and Colony).

A. — BELGIUM.

I. — **Railways belonging to or worked by the State.**

Etat (Chemins de fer de l') (4 640 k.) :

Permanent Commission of the Association :

◆ E. **Foulon***, administrateur-directeur général, president of the Permanent Commission (delegated by the Belgian Government);
◆ A. **Braem***, administrateur, member of the Permanent Commission (ditto);
◆ S. **Marchal***, administrateur, vice-president of the Permanent Commission (ditto);
◆ U. **Lamalle***, administrateur, member of the Permanent Commission and reporter (ditto).

Reporters :

◆ J. **Willem***, inspecteur général (ditto);
◆ H. **Chenu***, ingénieur en chef, inspecteur de direction (ditto).

Other delegates :

◆ **Gaeremynck***, ingénieur en chef, directeur d'administration (ditto);
◆ **Defrance***, délégué officiel du Département des chemins de fer à Londres (ditto).

Braine-le-Comte à Gand (Chemin de fer de) (65 k.) :

◆ R. **Boël,** ingénieur, commissaire.

Eecloo à Bruges (Chemin de fer d') (28 k.) :

◆ A. **Lepère,** président du conseil d'administration.

Tournay à Jurbise et Landen à Hasselt (Chemin de fer de) (46 k.) :

L. **Le Roy,** vice-président.

II. — **Private Companies.**

Chimay (Chemin de fer de) (61 k.).

Malines-Terneuzen (Chemin de fer de) (68 k.) :

◆ E. **D'Hanens,** administrateur-délégué.

Nord français (Chemin de fer du) (lignes Nord-Belges) (170 k.) :

◆ M. **Griolet,** administrateur;
◆ G. **Philippe***, inspecteur général (member of the Permanent Commission).

III. — **Light Railways belonging to the State.**

Vicinaux (Société nationale des chemins de fer) (4 294 k.) :

◆ **Levie,** président du conseil d'administration;
Le chevalier **Lagasse de Locht,** vice-président;
Colaert, administrateur;
◆ **Debarsy,** administrateur;
◆ **Gevaert,** administrateur;
◆ **Caufriez***, directeur général (member of the Permanent Commission);
◆ **Lembourg,** secrétaire général;
◆ **Belpaire***, ingénieur en chef-directeur (section principal secretary);
◆ **Van Noorbeeck,** inspecteur général des voies et travaux;
◆ **De Croës***, ingénieur en chef-directeur (reporter);
◆ **Jacobs,** ingénieur en chef-directeur.

IV. — **Light Railways privately owned.**

Compagnie belge de chemins de fer et d'entreprises (272 k.) :

L. **Wiener,** administrateur;
A. **Cayphas,** secrétaire général.

Economiques (Société générale de chemins de fer) (38 k.) :

G. **Crombé,** administrateur.

Liége-Seraing et extensions (Railways économiques) (20 k.) :

P. **Beyaert,** directeur.

V. — **Other Companies.**

Compagnie internationale des wagons-lits et des grands express européens (4 964 essieux à voyageurs et 76 essieux à marchandises) :

Noblemaire, directeur général;
◆ Baron R. **Snoy,** directeur de l'exploitation générale;
◆ **Müntz,** ingénieur en chef adjoint du service des études et des constructions;
◆ **Woytt,** ingénieur en chef adjoint du service des ateliers et de l'entretien;
◆ **Snow,** agent général pour l'Angleterre;
◆ **Viglione,** directeur régional de la compagnie, à Rome.

Compagnie auxiliaire internationale de chemins de fer (2 584 essieux à marchandises) :

F. **Sieges,** administrateur-délégué;
J. **Jaraczewski,** secrétaire.

B. — COLONY.

Bas-Congo au Katanga (Compagnie du chemin de fer du) (768 k.) :

◆ L. **Jadot,** administrateur-délégué;
◆ P. **Gillet,** ingénieur, chef de service des études et constructions.

Congo (Compagnie du chemin de fer du) (400 k.) :

G. **Geerts,** ingénieur, directeur général;
E. **Goffin,** ingénieur, chef du service technique.

Brésil (Brazil).

Est brésilien (Compagnie des chemins de fer de l') (2 128 k.) :

M. **Bouilloux-Lafont,** président du conseil d'administration;
A. **Bouilloux-Lafont,** secrétaire du conseil d'administration;
◆ E. **Cazenave,** administrateur-délégué;
R. **de Burlet,** administrateur;
◆ L. **Beck,** ingénieur-chef des services;
◆ M^lle **Caspar,** secrétaire de la compagnie.

Great Western of Brazil Railway (1 626 k. [1 011 miles]) :

◆ F. **Holt,** chairman of the board of directors;
◆ H. **Tattam,** director;
◆ W. M. **Codrington,** secretary;
◆ H. **Harper,** accountant;
◆ A. J. **Medlycott,** assistant secretary.

Leopoldina Railway (2 947 k. [1 831 miles]) :

◆ Maj.-Gen. Sir A. Crofton **Atkins,** K. C. B., director;
A. J. **Cruickshank,** O. B. E., director;
McC. Miller, general manager;
◆ J. H. **Drury,** London manager and secretary.

Chili.

Antofagasta (Chili) and Bolivia Railway (1 318 k. [819 miles]) :

A. W. **Bolden,** managing director;

C. S. **London**, works manager;
◆ W. A. **Pickwoad**, traffic manager.

Nitrate Railways (631 k. [392 miles]) :

◆ Lieut.-Col. A. C. **Macdonald**, D. S. O., director;
W. J. **Welch**, director;
◆ Captain Sir David Wilson **Barker**, R. D., R. N. R., director.

Taltal Railway (277 k. [172 miles]) :

◆ W. W. **Parish**, director;
◆ D. R. **Finnis**, secretary.

Chine (China).

I. — State Railways.

Etat (Chemins de fer de l').

Ligne du Lung-Hai (1 800 k.) :

◆ Y. C. **Whang Tsanhsi**, directeur général du chemin de fer du Lung-Hai, ancien directeur général des chemins de fer de l'Etat, premier président de la Commission de l'unification de la classification des marchandises et des règlements généraux du trafic des marchandises;
◆ **Ouang Hang**, C. E., ingénieur, représentant des chemins de fer de l'Etat chinois auprès de l'U. I. C., membre de la commission consultative et technique des communications et du transit de la Société des Nations.

Ligne Pékin-Hankow (1 200 k.) :

◆ Dr. C. C. **Wang***, C. E., Ph. D., conseiller supérieur du Ministère des communications, ex-président des chemins de fer de l'Est chinois, premier président de la Commission pour l'unification de la comptabilité et de la statistique des chemins de fer, directeur général des chemins de fer de l'Etat (delegated by the Chinese Government);
◆ Dr. S. **Tchéou-Weï***, ingénieur des ponts et chaussées, secrétaire général et conseiller technique de la délégation de la République de Chine auprès de la Société des Nations (ditto).

II. — Private Companies.

Chemins de fer et tramways en Chine (Compagnie générale de) (621 k.) :

J. **Jadot**, ingénieur, administrateur-délégué;
H. **Seymat**, ingénieur, directeur;
P. **Pasquier**, ingénieur, sous-directeur.

South Manchuria Railway (3 022 k. [1 878 miles]) :

◆ T. **Kaga**, civil engineer;
◆ K. **Shimizu**, civil engineer;
◆ Y. **Adzuma**, mechanical engineer;
◆ S. **Ito**, mechanical engineer;
◆ J. **Yamaguchi**, railway official;
◆ T. **Ito**, railway official;
◆ Y. **Shima**, civil engineer;
◆ N. **Yagimoto**, associate chief architect.

Costa-Rica.

Costa-Rica Railway (306 k. [190 miles]) :

◆ H. **Allen**, director;
A. J. **Shepherd**, director.

Danemark (Denmark).

I. — State Railways.

Etat (Chemins de fer de l') (2 410 k.) :

◆ T. **Alstrup***, general manager (member of the Permanent Commission and delegated by the Danish Government);
◆ A. **Floor**, director, chief of machine department;
◆ N. J. U. **Andersen**, director, chief of account and tarif department;
◆ J. J. **Graae**, chief of traffic department;
◆ C. C. **Wissenbach**, chief of district;
◆ G. C. **Valentiner**, head engineer;
◆ H. C. M. **Tvenge**, railway engineer.

II. — Private Companies.

Aalborg Privatbaner (259 k.) :

◆ Chr. A. **Rammeskov**, directeur-gérant.

Est de Seeland (Chemin de fer de l') (47 k.) :

◆ Chr. **Tiemroth**, secrétaire de la direction.

Fionie méridionale (Chemins de fer de la) (216 k.) :

◆ F. **Kier**, membre du gouvernement, conseiller d'Etat, président du conseil d'administration;
◆ J. P. **Stensballe**, sénateur, directeur-gérant.

Lolland-Falster (Chemin de fer de) (104 k.) :

◆ L. **Damm**, président.

Egypte (Egypt).

Etat (Chemins de fer de l') (3 098 k.) :

◆ Abdul Hamid Pacha **Soliman***, directeur général (member of the Permanent Commission and delegated by the Egyptian Government);
◆ J. C. **Serjeant***, ingénieur en chef du service de la voie (delegated by the Egyptian Government).

Espagne (Spain).

Andalous (Compagnie des chemins de fer) (1 703 k.) :

◆ D. J. **de Arteaga**, président du conseil d'administration;
V. **Montal**, administrateur;
◆ J. **Ymbern**, administrateur;
◆ S. **Rahola Puignau**, directeur;
◆ A. **de Albuquerque**, secrétaire du conseil.

Aragon (Chemin de fer central de) (302 k.) :

◆ **A. Stoclet**, administrateur;
J. Zeimet, secrétaire.

Catalans (Compagnie générale de chemins de fer) (201 k.) :

◆ **A. Pirard**, administrateur-délégué;
◆ **J. D'Hertoghe**, directeur général.

Great Southern of Spain Railway (168 k.) :

◆ **G. L. Boag**, general manager.

Madrid à Cacérès et au Portugal et Ouest de l'Espagne (Compagnie d'exploitation des chemins de fer de) (777 k.) :

◆ Le baron **de Satrústegui**, administrateur;
P. Rózpide, directeur;
L. de Cepeda, sous-directeur.

Madrid à Saragosse et à Alicante (Compagnie des chemins de fer de) (3 663 k.) :

◆ **E. Maristany***, marquis de l'Argentera, directeur général (member of the Permanent Commission);
◆ **A. Bauer**, président du Conseil d'administration;
◆ **C. Maristany**, administrateur-délégué;
◆ **E. Alfonso**, sous-directeur;
◆ **M. M. Arrillaga**, ingénieur en chef de la direction générale;
◆ **R. André**, ingénieur en chef du matériel et de la traction;
◆ **E. Heriz**, ingénieur en chef du mouvement, réseau catalan;
◆ **P. Alix**, ingénieur en chef adjoint du mouvement, ancien réseau;
◆ **M. Bustinduy**, ingénieur, sous-chef de la traction;
◆ **D. Mendizabal***, ingénieur en chef de la division du matériel fixe (reporter).

Medina del Campo à Salamanca (Compagnie des chemins de fer de) (77 k.).

Medina del Campo à Zamora et Orense à Vigo (Chemins de fer de) (297 k.) :

◆ **A. Massó Casañas**, président du conseil d'administration et directeur;
Le comte J. A. de Gamazo, vice-président du conseil d'administration.

Nord de l'Espagne (Compagnie des chemins de fer du) (3 692 k.) :

◆ Le marquis **de Alonso Martinez**, président du conseil d'administration;
◆ Le marquis **de Urquijo**, vice-président du conseil d'administration;
◆ Le marquis **de Caviedes**, vice-président du comité de Paris;
◆ **F. Boix**, administrateur-directeur;
◆ **E. Garre**, sous-directeur;
◆ **A. Dupont**, secrétaire général du comité de Paris;
◆ **F. Castellon**, ingénieur en chef de la voie et des travaux;
◆ **J. Garcia-Lomas**, ingénieur attaché à la direction.

Utrillas (Chemin de fer et mines d') (127 k.) :

S. Baselga y Ramirez, directeur-gérant.

Etats-Unis d'Amérique (United States of America).

Atlanta & West Point Railroad and the Western Railway of Alabama (352 k. [225 miles]).

Baltimore & Ohio Railroad (8 347 k. [5 187 miles]).

Bessemer & Lake Erie Railroad (354 k. [220 miles]).

Central of Georgia Railway (3 083 k. [1 916 miles]) :

L. A. Downs, president;
◆ **D. Rose**, European traffic manager.

Delaware & Hudson Company (1 258 k. [782 miles]) :

L. F. Loree*, president (member of the Permanent Commission);
◆ Colonel **J. T. Loree***, vice-president and general manager (reporter);
◆ **E. B. Gore**, executive secretary to the vice-president and general manager.

Delaware, Lackawanna & Western Railroad (1 577 k. [980 miles]) :

E. M. Rine, vice-president and general manager;
◆ **G. J. Ray***, chief **engineer** (reporter).

Elgin, Joliet & Eastern Railway (340 k. [211 miles]).

Erie Railroad (3 634 k. [2 258 miles]).

Hocking Valley Railway (552 k. [343 miles]) :

W. J. Harahan, president;
G. B. Wall, vice-president;
R. N. Begien, vice-president in charge of operation.

Illinois Central Railroad (7 725 k. [4 800 miles]) :

◆ **R. W. Bell***, general superintendent motive power (reporter);
◆ Donald **Rose***, European traffic manager (delegated by the Central of Georgia Railway).

Kansas City Southern Railway (1 355 k. [842 miles]) :

L. F. Loree*, chairman of the board (member of the Permanent Commission and delegated by the Delaware & Hudson Company);
G. C. Hand, vice-president;
◆ Dr. H. von **Schrenk**, consulting timber engineer.

Lehigh & New England Railroad (325 k. [202 miles]) :

S. D. **Warriner**, president;
R. H. **Wilbur**, vice-president and general manager.

Lehigh Valley Railroad (2 251 k. [1 399 miles]) :

◆W. E. **Grimshaw**, engineer.

Long Island Railroad (634 k. [394 miles]) :

C. D. **Baker**, general superintendent.

Missouri Pacific Railroad (11 824 k. [7 347 miles]) :

◆B. F. **Bush**, director;
◆C. **Howard**, president, Commonwealth Steel Corporation;
◆F. F. **Fitzpatrick**, president, Railway Steel Spring Company;
◆C. H. **Muchnic***, vice-president, American Locomotive Sales Corporation (delegated by the American Government).

New York Central Railroad (5 954 k. [3 700 miles]):

◆G. A. **Harwood**, vice-president in charge construction and development;
◆Dr. H. **von Schrenk***, consulting timber engineer (delegated by the Kansas City Southern Railway);
◆F. H. **Hardin**, chief engineer motive power and rolling stock;
◆G. L. **Bourne**, consulting engineer;
◆C. F. **Smith**, general superintendent, passenger transportation;
W. H. **Elliott***, signal engineer (reporter).

New York, Chicago & Saint-Louis Railroad (842 k. [523 miles]) :

◆Dr. Hermann von **Schrenk***, consulting timber engineer (delegated by the Kansas City Southern Railway and by the New York Central Railroad).

Norfolk & Western Railway (3 602 k. [2 238 miles]):

A. C. **Needles**, president;
C. S. **Churchill**, vice-president;
W. J. **Jenks**, vice-president in charge operation;
J. E. **Crawford**, general manager;
W. P. **Wiltsee**, chief engineer;
A. **Kearney**, superintendent motive power.

Pennsylvania Railroad System (16 927 k. [10 518 miles]):

W. W. **Atterbury***, vice-president (member of the Permanent Commission);
◆J. T. **Wallis***, chief of motive power (reporter);
◆W. C. **Cushing***, engineer of standards (ditto);
◆J. W. **Roberts**, general superintendent transportation, Eastern region;
◆H. M. **Carson**, general superintendent, Central Pennsylvania division, Eastern region;
◆H. E. **Newcomet**, general superintendent, Lake division, Central region;
C. S. **Krick**, regional vice-president, Eastern region;
E. T. **Whiter**, regional vice-president, Central region;
B. **McKeen**, regional vice-president, Southwestern region;
T. B. **Hamilton**, regional vice-president and general manager, Northwestern region;
A. C. **Shand**, chief engineer;
C. M. **Sheaffer**, chief of transportation.

Pittsburgh, Shawmut & Northern Railroad (338 k. [210 miles]):

J. D. **Dickson**, receiver;
◆D. D. **Dickson**, counsel for the receiver.

Reading Company (2 544 k. [1 581 miles]):

◆A. T. **Dice**, president;
◆S. T. **Wagner***, chief engineer (reporter);
◆R. B. **Abbott**, assistant general superintendent;
◆C. M. **Taylor**, superintendent of creosoting plant.

Richmond, Fredericksburg & Potomac Railroad (188 k. [117 miles]).

Southern Railway (10 560 k. [6 562 miles]).

Ulster & Delaware Railroad (208 k. [129 miles]).

Wabash Railway (3 980 k. [2 473 miles]):

W. H. **Williams**, chairman of the board of directors;
J. E. **Taussig**, president.

Finlande (Finland).

Etat (Chemins de fer de l') (4 231 k.) :

J. **Castrén**, directeur général;
◆V. **Jansson**, directeur supérieur;
◆V. V. **Airas**, directeur de la traction;
◆H. **Sahlstein**, directeur-adjoint des travaux et de la surveillance.

France, Algérie, Tunisie, Colonies et Protectorats (France, Algiers, Tunis, Colonies and Protectorates).

A. — FRANCE.

I. — State Railways.

Etat (Chemins de fer de l') (9 049 k.):

◆**Breaud**, directeur général;
◆**Payet**, chef de l'exploitation;
◆**Direz***, sous-chef de l'exploitation (reporter);
◆**Polart**, ingénieur de l'exploitation;
◆**Nasse**, chef du service du matériel et de la traction;
◆**Valentin**, ingénieur en chef de la traction;
◆**Lutton**, chef du service de la voie et des bâtiments;
◆**Dreyfuss**, ingénieur en chef adjoint de la voie et des bâtiments;
◆**Perrier**, chef du service des lignes nouvelles;
◆T. **Reymond**, secrétaire général.

Alsace et de Lorraine (Chemins de fer d') (2 005 k.):

◆ **H. Bauer,** directeur;
◆ **G. Pader,** ingénieur en chef attaché à la direction;
◆ **F. Jac,** secrétaire général;
◆ **A. Ertzbischoff,** ingénieur en chef de l'exploitation;
◆ **C. Renevey,** ingénieur en chef du matériel et de la traction;
◆ **J. Merklen*,** ingénieur en chef de la voie et des bâtiments (reporter);
◆ **C. Regnauld,** ingénieur en chef de la construction.

II. — Private Companies.

Ceinture de Paris (Chemins de fer de) (158 k.):

◆ **A. Bernard,** chef de l'exploitation.

Est (Compagnie des chemins de fer de l') (5 027 k.):

◆ **Girod de l'Ain,** administrateur;
Marlio, administrateur;
◆ **Riboud*,** directeur (member of the Permanent Commission);
◆ **Gruson,** secrétaire général;
◆ **Pellarin*,** ingénieur en chef, adjoint à l'ingénieur en chef de l'exploitation (reporter);
◆ **Collot*,** ingénieur en chef adjoint de l'exploitation (ditto);
◆ **Renard,** chef adjoint de l'exploitation;
◆ **Duchâtel,** ingénieur en chef du matériel et de la traction;
◆ **Wisdorff,** ingénieur principal au service central de la traction;
◆ **Poncet,** ingénieur principal au service central de la traction;
◆ **Descubes,** directeur des travaux;
◆ **Henry,** ingénieur en chef de la voie et des travaux;
◆ **Bouché-Leclercq,** ingénieur en chef attaché au service central de la voie.

Midi (Compagnie des chemins de fer du) (4 081 k.):

◆ **Teissier,** président du conseil d'administration;
d'Eichthal, vice-président du conseil d'administration;
◆ **J. R. Paul*,** directeur (member of the Permanent Commission);
◆ **Berveiller,** secrétaire général administratif;
◆ **Gufflet,** chef de l'exploitation;
◆ **Quarré,** chef de l'exploitation adjoint;
◆ **Bruneau*,** ingénieur en chef du service central de l'exploitation (reporter);
◆ **Bachellery,** ingénieur en chef du matériel et de la traction;
◆ **Leboucher,** ingénieur en chef des services techniques du matériel et de la traction;
◆ **Couvreux,** ingénieur en chef de la voie;
◆ **Godard,** ingénieur en chef de la construction des usines nouvelles et des usines hydro-électriques;
◆ **Laigle*,** ingénieur en chef adjoint à l'ingénieur en chef de la voie (reporter).

Nord (Compagnie du chemin de fer du) (3 830 k.):

G. Griolet*, vice-président du conseil d'administration (member of the Permanent Commission);
◆ **P. E. Javary*,** directeur de l'exploitation (ditto);
◆ **M. de Waru,** secrétaire du comité de direction;
◆ **L. Brévillé,** ingénieur en chef du matériel et de la traction;
◆ **F. Tettelin,** ingénieur en chef des travaux et de la surveillance;
◆ **A. Moyrand,** ingénieur en chef de l'exploitation;
◆ **R. Dautry,** ingénieur en chef de l'entretien;
◆ **G. Hemery,** ingénieur principal du matériel et de la traction;
◆ **P. Lancrenon,** ingénieur principal adjoint, chef adjoint des services du matériel roulant;
◆ **R. Le Besnerais,** ingénieur attaché au service central de l'exploitation;
◆ **E. Moutier*,** ingénieur en chef des services techniques de l'exploitation (reporter);
◆ **L. Cambournac*,** ingénieur des ponts et chaussées, ingénieur en chef des études, matériel des voies et bâtiments (ditto);
◆ **E. Soulez*,** ingénieur en chef attaché à la direction de l'exploitation (ditto).

Paris à Lyon et à la Méditerranée (Compagnie des chemins de fer de) (9 795 k.):

◆ **Cordier,** administrateur;
◆ **Margot*,** directeur général (member of the Permanent Commission);
Verlant, directeur de l'exploitation;
◆ **Mugniot,** ingénieur en chef de l'exploitation;
Tuja, ingénieur principal attaché au service central de l'exploitation;
◆ **Vallantin,** ingénieur en chef du service du matériel et de la traction;
◆ **Japiot,** ingénieur en chef adjoint du service du matériel et de la traction;
◆ **Richon,** ingénieur principal attaché au service central du matériel et de la traction;
Chambon, ingénieur principal du service du matériel;
◆ **Tête*,** ingénieur principal du service du matériel (reporter);
◆ **Quinquet,** ingénieur en chef du service de la voie;
◆ **Hachon,** ingénieur en chef attaché au service central de la voie;
◆ **Ruffieux*,** ingénieur en chef attaché au service central de la voie (reporter);
◆ **Santini*,** ingénieur du service des approvisionnements (section principal secretary).

Paris à Orléans (Compagnie du chemin de fer de) (7 792 k.):

◆ **C. Vergé,** président du conseil d'administration;
◆ **A. Bénac,** vice-président du conseil d'administration;
◆ **P. Richemond,** administrateur;

◆ A. **Mange***, directeur (member of the Permanent Commission);
◆ F. **Paul-Dubois**, sous-directeur;
◆ O. **Henry-Gréard**, chef de l'exploitation;
◆ M. **Lacoin**, ingénieur en chef du matériel et de la traction;
◆ C. **Jullien**, ingénieur en chef de la voie et des travaux;
◆ H. **Parodi**, ingénieur en chef adjoint du matériel et de la traction;
◆ Ed. **Epinay***, ingénieur en chef adjoint au chef de l'exploitation (reporter).

III. — **Light Railways.**

Bouches du Rhône (Régie départementale des chemins de fer et tramways électriques des) (175 k.):

Jules **Bourgougnon**, président du conseil d'administration.

Cambrésis (Compagnie des chemins de fer du) (120 k.):

L. C. J. **Rey**, directeur.

Chauny à Saint-Gobain (Chemins de fer de) (15 k.).

Départementaux (Compagnie de chemins de fer) (1 620 k.):

A. **Zens**, administrateur-délégué;
◆ F. **Goyard**, directeur;
M. **Béghin**, ingénieur en chef de l'exploitation;
D. **Ragenard**, ingénieur en chef des travaux et de la surveillance;
E. **Grellier**, ingénieur en chef du matériel et de la traction.

Départementaux du Tarn (Compagnie des chemins de fer) (150 k.):

◆ C. **Sapin**, administrateur-délégué.

Economiques (Société générale des chemins de fer) (2 718 k.):

J. **Joubert**, président du conseil d'administration;
M. **Auriol**, administrateur;
◆ F. **Berthelier**, administrateur;
J. **Virlet**, directeur;
◆ A. **Delille**, sous-directeur;
◆ J. **Michaut**, ingénieur en chef du matériel et de la traction;
◆ G. **Level**, inspecteur principal attaché à la direction.

Economiques du Nord (Chemins de fer) (365 k.):

◆ A. **Duriez**, directeur de l'exploitation;
◆ H. **Best**, ingénieur.

Est de Lyon (Chemins de fer de l') (104 k.).

Landes (Société anonyme des voies ferrées des) (363 k.).

Nord-Est (Chemins de fer secondaires du) (755 k.):

R. **Jourdain**, président du conseil d'administration;
◆ P. **Jourdain**, administrateur-directeur.

Provence (Chemins de fer de la) (590 k.):

◆ Le docteur **Just**, administrateur.

Saône-et-Loire (Régie départementale des chemins de fer de) (192 k.):

L. **Chevalier**, directeur.

Somain à Anzin et à la frontière belge (Chemin de fer de) (37 k.):

L. **Champy**, directeur général.

Sud-Ouest (Chemin de fer du) (400 k.).

Tramways de l'Ain (Régie départementale des) (436 k.):

◆ H. **Mielle**, ingénieur en chef du contrôle;
◆ L. **Mallez**, directeur.

Tramways départementaux des Deux-Sèvres (Compagnie des) (198 k.):

◆ G. **Tartary**, administrateur-directeur.

Tramways de l'Indre (Compagnie des) (182 k.):

◆ E. **Seydoux**, président du conseil d'administration.

Vicinaux (Compagnie générale des chemins de fer) (669 k.):

◆ M. **Bouteau**, administrateur;
L. **Bourdeaux**, directeur d'exploitation;
◆ R. **Masson**, directeur d'exploitation.

Voies ferrées d'intérêt local (Compagnie générale des) (513 k.):

◆ F. **Level**, directeur;
◆ A. **Hagneaux**, ingénieur de l'exploitation;
◆ G. **Crépin**, secrétaire-adjoint de la direction.

Transports en commun de la région parisienne (Société des) (1 010 k.):

A. **Mariage**, président du conseil d'administration, administrateur-délégué;
P. **Mariage**, directeur de l'exploitation commerciale;
A. **Gagné**, ingénieur en chef des services électriques, voie et bâtiments;
H. **Commartin**, ingénieur chargé de la direction des chemins de fer de grande banlieue.

B. — ALGÉRIE ET TUNISIE
(ALGIERS AND TUNIS).

I. — State Railways.

Algériens de l'Etat (Chemins de fer) (2 884 k.) :

F. **Barbedette**, président du conseil du réseau;
◆ **Raby**, inspecteur général des ponts et chaussées, vice-président du conseil du réseau;
C. **Rouzaud**, directeur;
J. **Côme**, sous-directeur;
L. **Jouaville**, chef de l'exploitation;
M. **Guillet**, chef du service du matériel et de la traction;
◆ H. **Tujague**, chef du service de la voie, des bâtiments et travaux neufs.

II. — Private Companies.

Algériens de la Compagnie P. L. M. (Chemins de fer) (1 060 k.) :

◆ **Luuyt**, sous-directeur de la compagnie, à Paris;
◆ **Jourdain**, directeur du réseau algérien, à Alger;
◆ **Séjourné**, sous-directeur de la compagnie, à Paris;
◆ **Canat**, ingénieur en chef du service de la construction, à Lyon.

Gafsa (Compagnie des phosphates et du chemin de fer de) (441 k.) :

M. **Pellé**, administrateur-délégué;
L. **Durandeau**, directeur.

Tunisiens (Compagnie fermière des chemins de fer) (1 580 k.) :

J. **de la Gravière**, administrateur;
R. **Debize**, chef du service du matériel et de la traction;
N. **This**, ingénieur en chef des services techniques;
F. **Dattée**, ingénieur en chef adjoint des services techniques;
E. **Wagner**, ingénieur.

C. — COLONIES ET PROTECTORATS
(COLONIES AND PROTECTORATES).

Afrique (Africa).

Afrique Occidentale Française (Chemins de fer de l') (2 915 k.) :

Launay, ingénieur en chef des travaux publics des colonies.

Dahomey (Compagnie française de chemins de fer du) (293 k.).

Dakar à Saint-Louis (Chemins de fer de) (264 k.) :

J. **Roland-Gosselin**, président du conseil d'administration;
R. **Godfernaux**, administrateur.

Franco-Ethiopien de Djibouti à Addis-Abeba (Chemin de fer) (783 k.) :

M. **Getten**, président du conseil d'administration, administrateur-délégué;
G. **Camut**, secrétaire général.

Asie mineure (Asia Minor).

Damas-Hamah et prolongements (Chemin de fer de) (583 k.) :

P. **Blanche**, administrateur-délégué;
Le comte **de Bouthillier-Chavigny**, administrateur;
R. **Marteaux**, directeur de l'exploitation.

Smyrne-Cassaba et prolongement (Chemin de fer de) (701 k.) :

Bourlon de Sarty, administrateur;
◆ J. P. **Monod**, vice-président du conseil d'administration;
◆ L. **Chenut**, administrateur.

Indochine (Indo-China).

Coloniaux de l'Indochine (Chemins de fer) (1 216 k.).

Indochine et du Yunnan (Ch. de fer de l') (871 k.) :

M. **Getten***, vice-président, directeur général (delegated by the Chemin de fer Franco-Ethiopien de Djibouti à Addis-Abeba);
G. **Chemin-Dupontes**, directeur de l'exploitation.

Réunion.

Réunion (Chemin de fer de la) (127 k.) :

◆ **Beau**, ingénieur des ponts et chaussées.

Grande-Bretagne et Nord de l'Irlande, Inde, Dominions, Protectorats et Colonies (Great Britain and Northern Ireland, India, Dominions, Protectorates and Colonies).

A. — GRANDE-BRETAGNE
ET NORD DE L'IRLANDE
(GREAT BRITAIN AND NORTHERN IRELAND).

I. — Group Companies.

Great Western Railway (5 651 k. [3 512 miles]) :

◆ The Right Hon. Viscount **Churchill***, G. C. V. O., chairman (member of the Permanent Commission and president of the English Section of that Commission);
◆ Sir Felix J. C. **Pole***, general manager (member of the English Section of the Permanent Commission);
◆ A. **Maynard***, assistant chief goods manager and development agent (ditto);
◆ R. H. **Nicholls***, C. B. E., superintendent of the line (reporter);
◆ R. **Cope***, chief accountant (ditto);

◆C. B. **Collett***, O. B. E., chief mechanical engineer (ditto);

◆Sir S. Ernest **Palmer,** Bart., deputy chairman;

◆Sir Aubrey **Brocklebank,** Bart., director;

◆D. **Davies***, M. P., director (member of the English Section of the Permanent Commission);

◆Sir Henry Mather **Jackson,** Bart., C. B. E., director;

◆The Right Hon. Viscount **Inchcape***, G. C. M. G., director (member of the English Section of the Permanent Commission);

◆J. F. **Mason***, director (ditto);

◆The Right Hon. Lord **Mildmay of Flete,** director;

◆The Right Hon. John W. **Wilson,** director;

◆The Right Hon. Lord **Glanely,** director;

◆J. **Milne,** C. S. I., assistant general manager;

◆A. E. **Bolter,** secretary;

◆E. **Ford,** chief goods manager;

◆A. G. **Hubbard***, solicitor (member of the English Section of the Permanent Commission);

◆J. C. **Lloyd,** joint chief engineer;

◆R. J. **Insell***, signal engineer (member of the English Section of the Permanent Commission);

◆J. A. **Kay***, agent (ditto);

◆H. H. **Spiller***, agent (ditto).

London Midland & Scottish Railway (11 204 k. [6 962 miles]):

◆Sir Wm. Guy **Granet***, G. B. E., chairman (member of the Permanent Commission and of the English Section of that Commission);

◆E. B. **Fielden,** M. P., deputy-chairman;

◆G. **Behrens***, director (member of the Permanent Commission and vice-president of the English Section of that Commission);

◆Sir John Field **Beale,** K. B. E., director;

◆The Hon. Arthur Henry **Holland-Hibbert,** director;

◆J. B. **Ismay***, director (member of the English Section of the Permanent Commission);

◆C. **Ker***, C. A., director (ditto);

◆The Right Hon. Lord **Lawrence of Kingsgate***, director (ditto);

Sir Thomas **Royden***, Bt., C. H., director (ditto);

◆Sir Edwin **Stockton,** director;

◆D. **Vickers,** director;

◆Sir Thomas **Williams,** director;

◆The Right. Hon. Henry Givens **Burgess***, general manager (member of the Permanent Commission and of the English Section of that Commission);

◆D. A. **Matheson,** deputy general manager for Scotland;

◆R. C. **Irwin,** secretary;

◆H. L. **Thornhill***, solicitor (member of the English Section of the Permanent Commission);

◆J. **Quirey***, accountant general (ditto);

◆J. H. **Follows***, C. B. E., chief general superintendent (reporter);

◆S. H. **Hunt***, C. B. E., chief goods manager (member of the English Section of the Permanent Commission);

◆E. F. C. **Trench,** chief engineer;

◆G. **Hughes,** C. B. E., chief mechanical & electrical engineer;

◆Sir Henry **Fowler***, K. B. E., deputy chief mechanical engineer (member of the Permanent Commission and of the English Section of that Commission, reporter);

◆R. W. **Reid***, C. B. E., carriage & wagon superintendent (member of the English Section of the Permanent Commission);

◆C. R. **Byrom***, O. B. E., assistant chief general superintendent (ditto);

◆A. **Davies***, M. B. E., general superintendent (passenger commercial) (ditto);

◆A. W. **Allen***, mineral manager (ditto);

◆W. **Clower***, O. B. E., assistant to general manager, staff and labour (reporter);

◆W. H. **Coomber***, divisional engineer (ditto);

◆H. **Marriott***, C. B. E., former assistant to general manager (secretary of the English Section of the Permanent Commission, reporter).

London & North Eastern Railway (10 655 k. [6 621 miles]):

◆Wm. **Whitelaw***, chairman (member of the English Section of the Permanent Commission);

◆The Right Hon. Lord **Faringdon,** C. H., director;

The Right Hon. Viscount **Grey of Fallodon,** K. G., director;

◆Sir Hugh **Bell,** Bart., C. B., director;

B. A. **Firth,** director;

◆Col. Wm. J. **Galloway,** director;

◆Sir Ralph Lewis **Wedgwood***, C. B., C. M. G., chief general manager (member of the English Section of the Permanent Commission);

◆A. **Wilson,** C. B. E., divisional general manager, Southern Area;

◆G. **Davidson,** divisional manager, North Eastern Area;

◆J. **Calder,** general manager, Scotland;

◆H. N. **Gresley,** C. B. E., chief mechanical engineer;

◆C. J. **Brown***, chief engineer (reporter);

◆A. L. **Gibson***, continental traffic manager (South) (member of the English Section of the Permanent Commission);

◆C. H. **Stemp,** C. B. E., superintendent Southern Scottish Area;

◆C. L. **Edwards***, C. B. E., chief accountant (member of the English Section of the Permanent Commission);

◆W. G. P. **Maclure***, locomotive running superintendent (Southern Area) (ditto);

◆C. J. **Selway***, C. B. E., passenger manager (Southern Area) (ditto);

◆W. **Clow***, C. B. E., superintendent (Southern Area) (ditto);

◆G. **Marshall***, goods manager (Southern Area) (ditto);

◆ J. H. **Smeddle***, O. B. E., locomotive running superintendent (North Eastern Area) (ditto);
◆ T. **Hornsby***, goods manager (North Eastern Area) (ditto);
◆ M. S. **Strang***, M. B. E., passenger manager (Southern Scottish Area) (ditto);
◆ W. A. **Fraser***, engineer (Southern Scottish Area) (ditto);
◆ H. A. **Watson***, M. V. O., C. B. E., consultant (ditto).

Southern Railway (3 404 k. [2 115 miles]):

◆ Brig. gen. The Hon. Everard **Baring***, C. V. O., C. B. E., chairman (member of the English Section of the Permanent Commission);
◆ The Right Hon. Sir Evelyn **Cecil***, G. B. E., M. P., privy councillor, director (member of the Permanent Commission and vice-president of the English Section of that Commission);
◆ Sir Francis **Dent***, C. V. O., director (member of the Permanent Commission and of the English Section of that Commission);
◆ G. W. E. **Loder**, director;
◆ Sir Herbert A. **Walker***, K. C. B., general manager (member of the English Section of the Permanent Commission);
◆ F. A. **Brant***, continental traffic assistant (ditto);
◆ H. A. **Sire**, chief commercial manager;
◆ R. E. L. **Maunsell***, chief mechanical engineer (reporter);
◆ A. W. **Szlumper**, chief engineer;
◆ W. J. **Thorrowgood***, signal and telegraph superintendent (reporter);
◆ E. C. **Cox***, chief operating superintendent (ditto);
◆ H. **Jones**, electrical engineer;
◆ G. **Ellson**, deputy chief engineer.

II. — Other Companies.

Cheshire Lines Committee (230 k. [143 miles]):

◆ F. **Tatlow***, director (member of the English Section of the Permanent Commission);
O. R. H. **Bury***, director (ditto);
◆ Wm. H. **Oates**, secretary and manager;
◆ A. P. **Ross**, engineer.

(1) *County Donegal Railways Joint Committee* (201 k. [125 miles]):

◆ T. F. **Cooke**, H. M. L., director;
◆ H. **Forbes**, secretary and manager.

(1) *Great Northern Railway (Ireland)* (896 k. [557 miles]):

◆ J. **Bagwell**, general manager;
◆ F. A. **Campion**, chief engineer;
◆ G. T. **Glover**, locomotive engineer.

Isle of Man Railway (74 k. [46 miles]).

Kent, Somerset & Shropshire Light Railway Group (153 k. [95 miles]):

◆ Lieut.-col. H. F. **Stephens**, managing director and engineer.

Liverpool Overhead Railway (16 k. [10 miles]):

◆ E. J. **Neachell**, general manager and engineer.

(1) *Londonderry and Lough Swilly Railways* (161 k. [100 miles]):

H. **Hunt**, general manager and secretary.

Metropolitan Railway (127 k. [79 miles]):

◆ The Right Hon. Lord **Aberconway***, P. C., chairman (member of the English Section of the Permanent Commission);
◆ R. H. **Selbie**, director and general manager.

London Midland & Scottish Railway (Northern Counties Committee) (423 k. [263 miles]):

Major John A. O. **Torres**, chairman;
◆ William K. **Wallace**, engineer.

Underground Electric Railways Company of London (101 k. [63 miles]):

◆ The Right Hon. Lord **Ashfield***, P. C., chairman and managing director (member of the English Section of the Permanent Commission);
◆ A. R. **Cooper***, chief engineer (reporter);
◆ F. **Pick***, assistant managing director (member of the English Section of the Permanent Commission);
◆ J. P. **Thomas**, operating superintendent.

Midland & Great Northern Railways Joint Committee (295 k. [183 miles]):

F. L. **Steel***, director of the Committee (member of the English Section of the Permanent Commission);
◆ H. V. **Mosley***, assistant to general manager, London Midland & Scottish Railway (ditto);
◆ R. B. **Walker**, traffic manager, Midland & Great Northern Joint Line;
J. **Cranham**, secretary, Midland & Great Northern Joint Line.

Great Central and Midland Joint Committee (63 k. [39 miles]):

◆ The Hon. Eric Brand **Butler-Henderson***, director (member of the English Section of the Permanent Commission);
◆ H. P. **Miles**, divisional engineer, London Midland & Scottish Railway.

(1) Also shewn under: Irish Free State.

B. — INDE, DOMINIONS, PROTECTORATS ET COLONIES (INDIA, DOMINIONS, PROTECTORATES AND COLONIES).

Afrique (Africa).

Gold Coast Government Railways (537 k. [334 miles]) :

◆ R. **Higham,** traffic manager;
D. W. **Ridsdale,** district engineer;
F. P. **O'Sullivan,** assistant locomotive superintendent.

Nigerian Railway (1 814 k. [1 127 miles]) :

A. E. **Sandell,** assistant chief engineer.

Mashonaland Railway (602 k. [374 miles]).

South African Railways and Harbours (17 601 k. [10 937 miles]) :

◆ Colonel R. **Collins,** chief mechanical engineer;
◆ A. S. **Collett,** divisional superintendent;
◆ W. G. J. **Hill,** chief assistant to general manager;
◆ G. G. **Elliott,** advisory engineer.

Sudan Government Railways & Steamers (2 763 k. [1 717 miles]) :

◆ Captain E. C. **Midwinter,** C. B., C. M. G., C. B. E., D. S. O., member of supervisory board;
◆ C. G. **Hodgson,** O. B. E., member of supervisory board;
◆ A. C. **Parker,** M. B. E., general manager;
◆ Major P. C. **Lord,** O. B. E., chief engineer;
◆ L. B. **Bayley,** divisional traffic superintendent;
◆ A. S. **Bull,** publicity manager, London Office.

Uganda Railway (995 k. [618 miles]) :

◆ D. H. **Elias,** M. C., superintendent of the line;
◆ H. E. **Goodship,** chief accountant;
◆ W. A. **Andrews,** assistant works manager.

Australasie (Australasia).

New South Wales Government Railways (8 449 k. [5 250 miles]).

New Zealand Government Railways (4 861 k. [3 021 miles]).

South Australia Government Railways (3 793 k. [2 357 miles]).

Canada.

Canadian National Railways (36 454 k. [22 652 miles]) :

Sir Henry W. **Thornton*,** chairman of the board of directors and president (member of the Permanent Commission);
◆ S. J. **Hungerford,** vice-president;
◆ A. E. **Warren,** general manager, Western region;
R. A. C. **Henry,** director, bureau of economics;
E. P. **Mallory,** director, bureau of statistics;
◆ W. S. **Thompson,** director of publicity;
◆ N. **Clougher,** engineer;
◆ J. **Haynes,** engineer;
W. H. **Hobbs,** secretary to president.

Quebec Central Railway (476 k. [296 miles]) :

◆ Sir George McLaren **Brown,** european general manager;
◆ H. H. **Boyd,** assistant chief mechanical engineer.

Ceylan (Ceylon).

Ceylon Government Railway (1 181 k. [732 miles]) :

◆ E. W. **Head,** deputy general manager (operating);
◆ J. J. P. **Felix,** divisional transportation superintendent;
◆ G. E. **Hooper,** deputy engineer, way and works;
◆ A. S. **Bobby,** mechanical engineer.

Inde (India).

Bengal Nagpur Railway (4 406 k. [2 738 miles]) :

Sir Trevredyn Rashleigh **Wynne,** managing director;
G. A. **Anderson,** director;
◆ C. E. **Chase,** superintendent transportation loco.;
◆ M. **Walton,** superintendent electrical branch;
◆ T. R. **Neely,** superintendent claims;
◆ F. S. **Hughes,** superintendent construction and survey.

Bengal & North Western Railway (3 304 k. [2 053 miles]) :

◆ Sir Henry P. **Burt,** K. C. I. E., C. B. E., chairman;
◆ E. A. **Neville,** managing director;
◆ L. L. **Cohen,** director;
◆ E. **Christian,** director;
Lieut.-col. T. **Gracey,** R. E., director;
◆ Lieut.-col. W. R. **Izat,** D. S. O., agent;
◆ J. R. **Silver,** locomotive and carriage and wagon superintendent.

Bombay, Baroda & Central India Railway (5 861 k. [3 642 miles]) :

◆ Major A. D. G. **Shelley,** R. E., chairman;
Sir Charles **Ollivant,** deputy chairman;
◆ Sir Henry P. **Burt*,** K. C. I. E., C. B. E., director (delegated by the Bengal & North Western Railway);
◆ A. R. **Barrand,** director;
◆ S. G. S. **Young,** secretary;
◆ N. **Lincoln,** assistant secretary;
◆ W. A. **Shakespear,** accountant;
◆ F. G. **Arnould,** chief engineer;
◆ F. J. H. **Sievwright,** traffic superintendent;
◆ Major-General Sir H. F. E. **Freeland,** agent.

Burma Railways (3 000 k. [1 864 miles]) :

G. A. **Hicks**, chief engineer;
W. **Kendall**, deputy agent;
G. G. T. **Toller**, district engineer.

Eastern Bengal Railway (State Railway of India) (780 k. [1 728 miles]) :

V. T. **Janson**, officiating chief engineer;
D. **Cardew**, deputy locomotive superintendent;
R. C. **Case**, assistant locomotive superintendent;
H. E. **Williams**, district traffic superintendent;
E. A. **Sims**, district traffic superintendent;
H. G. N. **White**, deputy locomotive superintendent.

East Indian Railway (State Railway of India) (463 k. [2 773 miles]).

Great Indian Peninsula Railway (5 534 k. [3 439 les]) :

W. G. **Barnett**, deputy agent;
C. T[illegible]man, deputy chief engineer;
P. A. **Edwards**, deputy transportation superintendent;
A. E. **Mould**, bridge engineer;
G. E. **Everett**, divisional engineer;
C. N. B. **Smart**, engineer;
A. P. **Goldney**, deputy traffic manager;
H. J. **Graham**, deputy transportation superintendent;
A. E. **Williams**, district mechanical engineer;
A. W. **Bruce-Joy**, assistant transportation superintendent.

Madras & Southern Mahratta Railway (4 873 k. 028 miles]) :

Colonel W. V. **Constable**, R. E., chairman;
Col. Sir Donald **Robertson**, K. C. S. I., deputy chairman;
Sir Walter Roper **Lawrence**, Bart., G. C. I. E., G. C. O., C. B., director;
L. R. W. **Forrest**, director;
Sir Seymour B. **Tritton**, consulting engineer;
Lieut.-col. H. **Bonham-Carter**, R. E., secretary;
Brig. Gen. Sir Charles Lane **Magniac**, C. M. G., C. B., R. E., agent;
J. G. R. **Marsh**, acting chief engineer;
J. F. **Fawcett**, deputy agent.

North Western Railway (State Railway of India) (315 k. [5 788 miles]) :

V. H. **Boalth**, chief commercial manager;
A. **Lines**, F. C. H., superintending engineer (officiating chief engineer);
E. B. **Robey**, deputy chief engineer;
C. E. **Spurgeon**, M. I. M. E., deputy chief mechanical engineer;
◆R. E. **Gordon**, Captain, M. C. R. E., executive engineer;
◆T. C. **Hales**, assistant deputy agent;
◆J. W. **Ogle**, divisional transportation officer;
◆S. **Avril**, divisional rolling stock officer;
◆W. T. **Biscoe**, divisional transportation officer;
◆F. B. **Martin**, temporary engineer.

Oudh & Rohilkhand Railway (2 585 k.[1 606 miles]) :

◆J. **Coates**, agent;
◆W. F. **Mathews**, Major, R. E., chief engineer;
◆M. S. S. **O'Connor**, Lieut.-col., traffic manager;
◆E. **Burton**, chief mechanical engineer;
E. G. **Rodwell**, deputy chief engineer;
◆J. M. S. **Trelawny**, executive engineer;
◆A. O. **Evans**, acting director of wagon interchange.

Rohilkund & Kumaon Railway (925 k. [575 miles]) :

◆Sir Henry P. **Burt***, K. C. I. E., C. B. E., chairman (delegated by the Bengal & North Western Railway and by the Bombay, Baroda & Central India Railway);
◆E. A. **Neville***, managing director (delegated by the Bengal & North Western Railway);
◆Lieut.-col. W. R. **Izat***, D. S. O., agent (ditto).

South Indian Railway (3 043 k. [1 891 miles]) :

◆A. **Muirhead**, C.I.E., chairman and managing director;
◆A. **Brereton**, C. S. I., deputy chairman;
◆G. **Deuchars**, C. I. E., director;
◆F. F. **Tweedie**, locomotive and carriage superintendent;
H. P. **O'Shaughnessy**, deputy chief engineer;
◆W. **Carmichael**, deputy traffic manager;
◆R. H. **Wigfall**, assistant auditor.

Etat libre d'Irlande (Irish Free State).

(1) *County Donegal Railways Joint Committee* (201 k. [125 miles]).

(1) *Great Northern Railway (Ireland)* (896 k. [557 miles]).

Great Southern Railways (3 513 k. [2 183 miles]) :

The Right Hon. Sir William J. **Goulding**, Bart., chairman;
◆Sir Walter R. **Nugent**, deputy-chairman;
Major H. A. **Henry**, director;
◆Sir Henry **Forde**, director;
◆A. **Jackson**, director;
◆M. F. **Keogh**, general manager;
◆C. E. **Riley**, secretary;
◆J. F. **Sides**, chief engineer.

(1) *Londonderry and Lough Swilly Railway* (161 k. [100 miles]).

(1) Also shewn under : Great Britain and Northern Ireland.

Malaisie (Malay Peninsula).

Federated Malay States Railways (1 680 k. [1 044 miles]) :

◆ P. H. **Henshaw**, agent general manager;
A. W. S. **Graeme**, locomotive superintendent.

Mésopotamie (Mesopotamia).

Iraq State Railways (1 218 k. [757 miles]) :

◆ A. C. **Griffin**, deputy director of railways;
◆ D. R. M. **Yates**, acting locomotive superintendent;
◆ F. C. **Dodge**, district traffic superintendent;
◆ P. G. **Blyton**, district engineer.

Grèce (Greece).

I. — State Railways.

Etat (Chemins de fer de l') (1 270 k.) :

◆ K. **Pantazis***, directeur des chemins de fer au Ministère des communications (delegated by the Grecian Government).

II. — Private Companies.

Nord-Ouest de Grèce (Compagnie des chemins de fer du) (74 k.).

Pirée-Athènes-Péloponèse (Chemin de fer) (750 k.) :

◆ K. **Pantazis***, directeur des chemins de fer au Ministère des communications (delegated by the Grecian Government and State Railways).

Thessalie (Compagnie des chemins de fer de) (233 k.) :

N. **Carolou**, président du conseil d'administration;
A. **Balanos**, ingénieur-administrateur.

Italie (Italy).

I. — State Railways.

Etat (Chemins de fer de l') (16 453 k.) :

◆ L. **Velani***, ingénieur, vice-directeur général (reporter);
◆ F. **Fiori***, ingénieur, chef de service principal (member of the Permanent Commission);
◆ R. **Gioppo***, ingénieur, inspecteur supérieur à la direction générale (ditto);
◆ A. **Fabris***, ingénieur, chef du service du matériel et de la traction (ditto);
◆ G. **Barbieri**, ingénieur, chef de service;
◆ E. **Ehrenfreund**, ingénieur, chef de la direction compartimentale de Turin;
◆ L. **Ermolli**, ingénieur, chef de service au service du mouvement et du trafic;
◆ G. **Forte***, ingénieur, inspecteur chef supérieur au service du matériel et de la traction (reporter);
◆ C. **De Benedetti***, ingénieur en chef du service des voies et travaux (reporter);
◆ B. **Nobili**, ingénieur, inspecteur chef supérieur;
◆ E. **Peretti**, ingénieur, inspecteur chef supérieur à l'Institut des expériences;
◆ E. **Prandoni**, ingénieur, inspecteur chef supérieur au service du mouvement et du trafic;
◆ L. **Tosti**, ingénieur, inspecteur chef supérieur au service du personnel et des affaires générales;
◆ L. **Belmonte**, ingénieur, inspecteur chef au service du mouvement et du trafic;
◆ G. **Bianchi**, ingénieur, inspecteur chef au service du matériel et de la traction;
◆ N. **Giovene**, ingénieur, inspecteur chef au service du personnel et des affaires générales;
◆ E. **Vanni***, ingénieur, inspecteur principal à la direction générale (section secretary).

II. — Principal Private Companies.

Méditerranée (Société italienne des chemins de fer de la) (267 k.).

Nationale (Société) de chemins de fer et de tramways (150 k.) :

◆ G. **Ottone***, ingénieur, administrateur-délégué (delegated by the Federation of Transport);
◆ L. **Ottone**, avocat.

Nord de Milan (Société du chemin de fer du) (246 k.) :

◆ R. **Luzzati**, ingénieur, directeur;
U. V. **Mazza**, administrateur.

Vénitienne (Société) pour la construction et l'exploitation de chemins de fer secondaires en Italie (590 k.) :

A. **Gaggia**, ingénieur, président;
Professeur D. **Poli**, directeur;
G. **Fattori**, ingénieur, chef de service.

III. — Secondary Private Companies.

Apennin central (Société des chemins de fer de l') (135 k.).

Canavèse (Société du chemin de fer central et tramways du) (59 k.) :

M. **Pellegrini**, ingénieur, administrateur-délégué.

Reggio-Emilia (Société pour les chemins de fer de) (71 k.) :

G. **Menada**, président du conseil d'administration.

Salentine (Société anonyme du chemin de fer) (243 k.) :

◆ C. R. **Bombrini**, président du conseil d'administration;
◆ G. dei Baroni **Cataldi**, ingénieur, administrateur-délégué.

Sardaigne (Société pour les chemins de fer complémentaires de la) (697 k.) :

G. **Luzzatti**, avocat, membre du conseil d'administration;
E. **Mellini**, ingénieur, inspecteur supérieur;
G. C. **Fuortes**, ingénieur, commissaire.

Suzzara-Ferrara (Chemin de fer de) (82 k.) :

G. **Belardini**, ingénieur, directeur de l'exploitation.

IV. — **Light Railways.**

Circumetnea (Chemin de fer) (Société sicilienne de travaux publics) (114 k.) :

A. **Natoli la Mantea**, vice-président-délégué.

Emilienne (Société) de chemins de fer, tramways et automobiles (120 k.) :

◆ E. **Guastalla**, ingénieur, administrateur-délégué.

Lombardie et Romagnes (Tramways de) (175 k.) :

◆ Ch. **Thonet**, ingénieur, président.

Milan-Bergame-Crémone (Tramways interprovinciaux 142 k.) :

◆ C. **Defacqz**, administrateur-délégué.

Piémontais (Tramways à vapeur) (180 k.) :

◆ Dr. P. **Lo Balbo***, directeur (reporter).

Province de Pise (Chemins de fer économiques et tramways à vapeur de la) (41 k.) :

E. **Péacani**, directeur général.

Rome, Milan, Bologne, etc. (Tramways et chemins de fer économiques) (31 k.) :

L. **Maryssael**, ingénieur, inspecteur général.

Tessin (Chemin de fer du) (242 k.) :

◆ J. **Van den Savel**, administrateur-délégué;
◆ P. **Giovanola**, directeur de l'exploitation.

Turinoise (Société) de tramways et de chemins de fer économiques (76 k.) :

◆ G. **Salvadori**, ingénieur, administrateur-délégué.

Vercellesi (Tramways) (112 k.) :

L. **Cornara**, ingénieur, directeur.

Vicinaux (Société anonyme pour les chemins de fer) 136 k.) :

D. **L'Abbate**, ingénieur, directeur.

V. — **Other Companies.**

Fédération des transports (2 996 k.) :

◆ F. **Tajani***, ingénieur, président de la Fédération des transports (member of the Permanent Commission);
◆ G. **Ottone***, ingénieur, vice-président de la Fédération des transports (delegated by the Société nationale de chemins de fer et de tramways);
◆ F. **D'Onofrio**, avocat, président du chemin de fer Agnone-Pescolanciano;
I. **Migliau**, ingénieur, directeur des chemins de fer électriques de Biella;
A. **Natoli la Mantea***, avocat, vice-président des chemins de fer Circumetnea et de la Société de travaux publics (delegated by the Société sicilienne de travaux publics, chemin de fer Circumetnea);
◆ M. **Semenza**, ingénieur;
◆ E. **Simonetti**, ingénieur, directeur de l'Union italienne de tramways électriques;
P. **Biraghi***, ingénieur, administrateur-délégué du chemin de fer de Corleone-San Carlo (reporter);
◆ E. **Denti**, ingénieur, conseiller délégué de la Société Traction électrique Lombarda;
◆ G. **Vallecchi**, ingénieur, directeur de la Taranto Tramway & E. S. Co.

Luxembourg (Luxemburg).

Guillaume-Luxembourg (Chemins de fer) (257 k.) :

T. **Dutreux**, président honoraire et vice-président du conseil d'administration;
A. **Dutreux**, membre du conseil d'administration.

Prince-Henri (Chemins de fer et minières) (250 k.) :

◆ A. **Sorel**, ingénieur, directeur.

Norvège (Norway).

I. — **State Railways.**

Etat (Chemins de fer de l') (3 020 k.) :

◆ E. **Heiberg***, directeur général (delegated by the Norvegian Government);
◆ A. G. **Jynge**, administrateur;
◆ D. L. **Esmark**, directeur.

II. — **Private Company.**

Oslo-à Eidsvold (Chemin de fer de) (68 k.) :

◆ Olaf **Storsand**, ingénieur en chef de la traction et du matériel.

Pays-Bas et Colonies (Holland and Colonies).

A. — HOLLAND.

I. — **Private Companies.**

Chemins de fer néerlandais (Compagnie pour l'exploitation des chemins de fer de l'Etat néerlandais et Compagnie du chemin de fer hollandais) (3 685 k.) :

◆ J. A. **Kalff**, ingénieur, membre de la direction;

◆ H. P. **Maas Geesteranus***, ingénieur en chef, chef du service des voies et tavaux (reporter);

◆ H. E. **Hoekstra**, ingénieur, chef du service de la traction;

Prof. I. **Franco**, ingénieur, chef du service du matériel des ateliers et de la traction électrique;

◆ T. M. F. C. **Jorissen**, chef du service des transports;

◆ W. **Simon-Thomas***, ingénieur, chef de division au service de l'exploitation (reporter).

II. — **Light Railways.**

Breskens-Maldegem (Tramways à vapeur de) (42 k.).

Sud-Néerlandais (Tramways à vapeur) (100 k.) :

J. **Carlier**, vice-président du conseil d'administration.

B. — COLONIES.

Etat aux Indes néerlandaises (Chemins de fer de l') (3 958 k.) :

◆ J. K. **Lagerwey**, ingénieur supérieur, chef de l'exploitation du tramway d'Atchin (Atjeh).

Indes néerlandaises (Compagnie des chemins de fer des) (802 k.) :

◆ Chevalier J. C. **Van Reigersberg Versluijs**, membre du conseil d'administration;

◆ W. H. **Van Schouwenburg**, ingénieur en chef.

Semarang-Cheribon (Société des tramways à vapeur) (390 k.) :

◆ G. P. J. **Caspersz**, directeur.

Pologne (Poland).

Etat (Chemins de fer de l') (16 659 k.) :

◆ J. **Eberhardt***, ingénieur, sous-secrétaire d'Etat (delegated by the Polish Government);

A. **Frank***, ingénieur des ponts et chaussées, inspecteur au Ministère des chemins de fer (member of the Permanent Commission);

◆ J. **Berkiewicz**, ingénieur, président de la direction de construction des chemins de fer;

◆ W. **Czapski***, ingénieur, directeur du département de l'exploitation (delegated by the Polish Government);

◆ S. **Kolakowski**, directeur du département commercial et des tarifs;

J. **Mrozowski**, ingénieur, directeur du département de conservation et de construction des chemins de fer;

◆ A. **Wasiutynski**, ingénieur, professeur;

◆ J. **Wagner**, ingénieur, chef de section du département mécanique et du matériel.

◆ A. **Pawlowski**, ingénieur, inspecteur au Ministère des chemins de fer;

◆ J. **Gieysztor**, professeur, chef de section au département commercial des tarifs.

Portugal and Colonies.

A. — PORTUGAL.

I. — **State Railways.**

Etat (Chemins de fer de l') (1 329 k.) :

◆ F. P. **Teixeira**, administrateur général;

◆ P. O. S. **Silva**, directeur du chemin de fer Sud et Sud-Est;

◆ R. S. **Monteiro**, administrateur adjoint;

◆ T. F. **de Almeida**, ingénieur en chef de la traction du chemin de fer de Minho e Douro.

II. - **Private Companies.**

Beira-Alta (Compagnie des chemins de fer portugais de la) (253 k.) :

◆ L. F. da Silva **Vianna**, administrateur-délégué;

◆ J. Gomes de **Souza Leal**, agent commercial.

Compagnie des chemins de fer portugais (1 073 k.) :

A. **de Vasconcellos Corrêa**, administrateur;

J. **de Fontes Ferreira de Mesquita**, directeur général;

◆ A. **de Lima Henriques**, ingénieur en chef de l'exploitation;

◆ A. V. **Ferreira**, ingénieur en chef de la construction;

◆ P. J. **Diniz***, ingénieur en chef du matériel et de la traction (delegated by the Compagnie nationale des chemins de fer portugais).

Compagnie nationale des chemins de fer portugais (185 k.) :

◆ P. J. **Diniz**, administrateur-délégué.

B. — COLONIES.

Etat (Chemins de fer de l') (1 049 k.) :

◆ E. J. **Navarro**, ingénieur des arts et manufactures, ancien administrateur des chemins de fer de l'Etat, chef de bureau au Ministère des colonies;

◆ C. M. F. **Torres**, ingénieur, administrateur des chemins de fer de l'Etat;

◆ H. P. P. **Bravo**, Junior, ingénieur, sous-directeur du chemin de fer de Minho e Douro;

◆ Caetano Marquis de **Amorim**, ingénieur, sous-directeur du chemin de fer du Sud et Sud-Est.

Roumanie (Roumania).

Etat (Chemins de fer de l') (11 192 k.) :

◆ S. **Pretorian**, directeur général;

◆ C. **Mereutza***, sous-directeur général (member of the Permanent Commission);

◆ A. **Russ**, directeur du service du mouvement;

◆ V. **Stoïka**, sous-directeur du service de l'entretien;

◆ **Paunesco**, directeur du service des ateliers;

◆ **Cantuniar**, directeur du service des ateliers;
◆ **T. Bals**, directeur.

Salvador.

Salvador Railway (161 k. [100 miles]).

Serbes, Croates et Slovènes (Royaume des). (Yugo-Slavia.)

Etat (Chemins de fer de l') (1 952 k.).

Suède (Sweden)

I. — State Railways.

Etat (Chemins de fer de l') (5 625 k.) :

◆ **A. Granholm***, directeur général (member of the Permanent Commission and delegated by the Swedish Government);
◆ **Hj. Fogelmarck**, ingénieur en chef;
◆ **G. Löfmarck**, chef de district;
◆ **E. von Friesen**, chef de district;
◆ **A. Almqvist**, directeur;
C. Olofsson, directeur;
I. Ofverholm, directeur;
K. Svensson, directeur;
◆ **A. Tydén**, directeur de la ligne;
◆ **S. Norrman**, sous-directeur;
◆ **L. Akselsson**, chef de section.

II. — Private Companies.

Bergslagen (Chemin de fer) (552 k.) :

◆ **A. Norrby**, chef de l'exploitation;
◆ **H. Bernhardt**, ingénieur en chef;
◆ **V. Ahlberg**, ingénieur en chef de la traction.

Blekinge Kustbanor (168 k.) :

◆ **S. Holmgren**, chef d'administration.

Frövi-Ludvika (Chemin de fer) (98 k.) :

◆ **J. Johnson**, general manager.

Gefle-Dala (Société du chemin de fer) (293 k.).

Göteborg-Boras & Boras-Alfvesta (Chemin de fer) 261 k.) :

◆ **C. Sprinchorn**, directeur en chef;
◆ **N. Richnau**, ingénieur en chef de la traction.

Halmstad-Nässjö (Chemin de fer) (411 k.) :

◆ **O. Wallenberg**, membre de l'administration;
◆ **A. Wiman**, directeur-gérant.

Helsingborg-Hessleholm (Chemin de fer) (122 k.) :

◆ Le baron **A. Thott**, directeur en chef.

Kalmar-Nya (Chemin de fer) (195 k.) :

◆ **L. V. Stahle**, directeur général.

Karlstad-Munkfors, Nordmarks-Klarelfvens, Filipstads Norra-Bergslagen (Chemins de fer) (171 k.) :

◆ **K. A. Pallin**, directeur de l'exploitation.

Mellersta Oestergötland (Chemin de fer) (125 k.) :

◆ **O. Bärnheim**, directeur en chef.

Nässjö-Oskarshamn (Chemin de fer) (148 k.) :

◆ **Y. Hjortzberg**, capitaine aux ponts et chaussées, ingénieur en chef.

Norra-Bergslagen (Chemin de fer) (173 k.) :

◆ Le major **E. Hildebrand**, directeur.

Norra-Oestergötland (Société du chemin de fer de) (134 k.) :

◆ **E. M. Lindgren**, directeur de l'exploitation.

Norrköping-Söderköping-Vikbolandets (Chemin de fer de) (102 k.) :

◆ **H. O. Johnson**, locomotive superintendent.

Norsholm-Westervick-Hultsfred (Chemin de fer de) (245 k.) :

◆ **A. Rune**, president;
◆ **J. V. Mattsson**, chief general manager.

Stockholm-Roslag (Chemin de fer) (200 k.) :

◆ **A. Nerell**, director;
F. Wickström, traffic manager.

Stockholm-Vesteras-Bergslagen (Chemin de fer) (479 k.) :

A. Kamph, administrateur-délégué;
◆ **W. Grandinson**, directeur des voies.

Uddevalla-Venersborg-Herrljunga (Chemin de fer de) (92 k.) :

◆ **R. Wester**, chef du trafic.

Västergötland-Göteborg (Chemin de fer) (339 k.) :

◆ **J. Nyström**, managing director;
◆ Doctor **I. Hallberg**, manager.

Suisse (Switzerland).

I. — Standard Gauge Lines.

Fédéraux (Chemins de fer) (2 942 k.) :

◆ **J. Zingg***, président de la direction générale (member of the Permanent Commission);

◆ A. **Schrafl**, directeur général;
◆ E. **Gorjat**, directeur du premier arrondissement;
◆ H. **Etter**, directeur du deuxième arrondissement;
◆ Dr. E. **Locher**, directeur du troisième arrondissement;
◆ E. **Labhardt**, ingénieur en chef de la voie à la direction générale;
◆ E. **Matter**, chef principal de l'exploitation;
◆ M. **Weiss***, ingénieur en chef de la traction à la direction générale (reporter);
◆ Le Dr. R. **Cottier***, secrétaire général (section secretary);
◆ F. **Steiner**, ingénieur, chef de section à la division de la traction et des ateliers.

Alpes bernoises (Berne-Lötschberg-Simplon) (Compagnie du chemin de fer des) (253 k.) :

◆ G. **Kunz***, directeur (member of the Permanent Commission);
J. **Ammann**, chef du service commercial.

II. — **Narrow Gauge Lines.**

Birsig (Chemin de fer de la vallée de) (17 k.).

Rhétique (Chemin de fer) (276 k.) :

E. **Bernasconi**, Oberingenieur.

Viège à Zermatt (Chemin de fer de) (35 k.) :

A. **Marguerat**, ingénieur, directeur.

Yverdon-Sainte-Croix (Compagnie du chemin de fer) (25 k.) :

◆ E. **Jeanneret**, directeur.

III. — **Rack and cable Railways.**

Lausanne à Ouchy (Chemin de fer de) (2 k.) :

◆ P. Th. **Dufour**, ingénieur, président du comité de direction.

Tchéco-Slovaquie (Czecho-Slovakia).

Etat (Chemins de fer de l') (12 429 k.) :

◆ E. **Kabeš***, ingénieur, chef de section (delegated by the Czecho-Slovakian Government);
E. **Kejr***, ingénieur, conseiller des constructions du département V/1 (member of the Permanent Commission);
◆ J. **Hauer**, ingénieur, conseiller ministériel;
◆ H. **Deyl***, ingénieur, conseiller ministériel (reporter);
◆ R. **Klatovsky**, ingénieur, conseiller ministériel.

Uruguay.

Central Uruguay Railway of Monte Video (1 577 k. [980 miles]) :

◆ F. **Henderson**, chairman;
H. J. **Bell**, director;
◆ W. **Higgins**, director;
◆ G. R. **Cable**, secretary;
◆ H. O. **Tubby**, assistant secretary.

North Western of Uruguay Railway (182 k. [113 miles]) :

◆ R. F. **Fisher**, secretary.

C. — Delegates of associations affiliated to the Congress

American Railway Association :

D. **Willard***, chairman of the board (member of the Permanent Commission);
R. H. **Aishton***, president (ditto);
W. G. **Besler**, president, Central Railroad of New Jersey;
S. M. **Felton**, president, Chicago Great Western Railroad;
◆ Dr. J. H. **Parmelee**, director of railway economics;
◆ S. O. **Dunn**, editor, *Railway Age;*
◆ H. J. **Forster**, secretary;
◆ L. B. **Sherman**, assistant consulting administrator of public relations;
B. T. **Anderson**, superintendent of signals, Chesapeake & Ohio Railway;
◆ B. F. **Bush***, director, Missouri Pacific Railroad (delegated by the Missouri Pacific Railroad);
◆ S. **Withington**, electrical engineer, New York, New Haven & Hartford Railroad;
◆ P. R. **Albright**, vice-president and general manager, Atlantic Coast Line Railroad.

Railway Clearing House (Great Britain) :

◆ E. R. **Turton**, chairman;
◆ H. T. **Bailey**, director;
◆ P. H. **Price**, secretary;
◆ E. E. **Painter**, assistant to secretary;
◆ J. C. **Bowyer**, assistant to secretary;
◆ The Hon. Edward Granville **Eliot**, solicitor.

International Union of Railways :

◆ G. **Leverve**, ingénieur en chef, secrétaire général;
◆ A. **Pourcel**, ingénieur en chef de la Compagnie des chemins de fer P. L. M.;
◆ **Rousseau**, ingénieur attaché au secrétariat général de l'Union.

ALPHABETICAL INDEX OF DELEGATES PRESENT AT THE SESSION

INDICATING THE SECTIONS THEY ATTENTED.

Number.	NAME.	DELEGATED BY	SECTIONS.
730	**Abbott** (R. B.)	Reading Company (United States of America)	1, 2 & 3
55	**Aberconway** (The Right Hon. Lord).	Permanent Commission of the Association (English section)	1, 2, 3, 4 & 5
672	**Adzuma** (Y.)	South Manchuria Railway (China)	2 & 3
400	**Ahlberg** (V.)	Chemin de fer Bergslagen (Sweden)	2 & 5
486	**Airas** (V.)	Chemins de fer de l'Etat (Finland)	2
630	**Akselsson** (L.)	Chemins de fer de l'Etat (Sweden)	3 & 4
1000	**Albright** (P. R.)	American Railway Association (United States of America)	3
175	**Albuquerque** (A. de)	Chemins de fer Andalous (Spain)	3 & 5
905	**Alessio** (F. d')	Ministère des communications (Italy)	4 & 5
465	**Alfonso** (E.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	3 & 4
469	**Alix** (P.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	2, 3 & 4
559	**Allen** (A. W.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3 & 4
931	**Allen** (G. H. L.)	Permanent Commission of the Association (section secretary)	4
165	**Allen** (H.)	Costa-Rica Railway	4
121	**Allen** (H. C.)	Buenos Ayres Great Southern Railway (Argentine)	3, 4 & 5
700	**Almeida** (T. F. de)	Chemins de fer de l'Etat (Portugal)	2 & 4
624	**Almqvist** (A.)	Chemins de fer de l'Etat (Sweden)	4 & 5
183	**Alonso Martinez** (Marquis de).	Chemins de fer du Nord de l'Espagne	3 & 4
16	**Alstrup** (T. A.)	Permanent Commission of the Association, Ministère des travaux publics and Chemins de fer de l'Etat (Denmark)	4
860	**Amorim** (Marquis C. de)	Chemins de fer de l'Etat dans les colonies (Portugal)	3 & 5
457	**Andersen** (N. J. U.)	Chemins de fer de l'Etat (Denmark)	3 & 4
467	**André** (R.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	2 & 4
120	**Andreae** (Ch.)	Département fédéral des chemins de fer (Switzerland)	1 & 3
578	**Andrews** (W. A.)	Uganda Railway (Africa)	2
314	**Arnould** (F. G.)	Bombay, Baroda & Central India Railway (India)	1, 4 & 5
466	**Arrillaga** (M.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	1
171	**Arteaga** (D. J. de)	Chemins de fer Andalous (Spain)	3 & 5
56	**Ashfield** (The Right Hon. Lord).	Permanent Commission of the Association (English section) and Underground Electric Railways Company of London (Great Britain)	1, 2, 3, 4 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
54	**Ashley** (The Right Hon. Lieut.-col. Wilfred) . . .	Permanent Commission of the Association (Engish section) and Ministry of Transport (Great Britain)	4
957	**Atkins** (Maj.-Gen. Sir A. Crofton).	Leopoldina Railway (Brazil)	1, 2, 3 & 4
850	**Avril** (S.)	North Western Railway (India) . . .	2 & 5
217	**Bachellery** (A.)	Chemins de fer du Midi (France) . . .	2
296	**Bagwell** (J.)	Great Northern Railway (Irish Free State)	1, 2 & 3
568	**Bailey** (H. T.)	Railway Clearing House (Great Britain)	4
870	**Baldwin** (J. G.)	Foreign Office (Great Britain)	4
755	**Bals** (T.)	Chemins de fer de l'Etat (Roumania) .	2 & 5
983	**Barbieri** (G.)	Chemins de fer de l'Etat (Italy) . . .	1, 3 & 4
560	**Baring** (Brig. gen. The Hon. Everard).	Permanent Commission of the Association (English section) and Southern Railway (Great Britain)	1, 2 & 3
455	**Barker** (Captain Sir David Wilson).	Nitrate Railways (Chili)	2 & 3
873	**Barlow** (J. A. N.)	Ministry of Labour (Great Britain) . .	3 & 4
40	**Barnet Lyon** (L. M.) . .	Permanent Commission of the Association and Ministère du waterstaat (Holland)	1, 2 & 5
323	**Barnett** (W. G.)	Great Indian Peninsula Railway (India)	1, 3 & 4
408	**Bärnheim** (O.)	Chemin de fer Mellersta Oestergötland (Sweden)	3 & 4
310	**Barrand** (A. R.)	Bombay, Baroda & Central India Railway (India)	1 & 3
1006	**Batchen** (T. M.)	Free State of Ireland Government . .	1 & 2
463	**Bauer** (A.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	3 & 4
205	**Bauer** (H.)	Chemins de fer d'Alsace et de Lorraine .	1, 2, 3 & 4
967	**Bayley** (L. B.)	Sudan Government Railways and Steamers	3 & 4
541	**Beale** (Sir John Field) . .	London Midland & Scottish Railway (Great Britain)	4
678	**Beau** (C.)	Chemin de fer de la Réunion	2 & 5
160	**Beck** (L.)	Chemins de fer de l'Est brésilien . . .	2 & 3
4	**Behrens** (G.)	Permanent Commission of the Association and London Midland & Scottish Railway (Great Britain)	3
854	**Belardini** (G.)	Chemin de fer de Suzzara-Ferrara (Italy)	2 & 5
651	**Bell** (Sir Ernest Albert Seymour).	Permanent Commission of the Association and Under Secretary of State for India	3 & 4
288	**Bell** (Sir Hugh)	London & North Eastern Railway (Great Britain)	1, 3 & 4
89	**Bell** (R. W.)	Illinois Central Railroad (United States of America)	2
360	**Belmonte** (L.)	Chemins de fer de l'Etat (Italy) . . .	3 & 4
449	**Belpaire**	Société nationale des chemins de fer vicinaux (Belgium)	5
222	**Bénac** (A.)	Chemin de fer de Paris à Orléans (France)	3 & 4
855	**Berkiewicz** (J.)	Chemins de fer de l'Etat (Poland) . .	1, 3, 4 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
911	Bernard (A.)	Chemin de fer de Ceinture de Paris (France)	3, 4 & 5
399	Bernhardt (H.)	Chemin de fer Bergslagen (Sweden)	1 & 5
247	Berthelier (F.)	Société Générale des chemins de fer économiques (France)	5
214	Berveiller	Chemins de fer du Midi (France)	4
734	Best (H.)	Chemins de fer économiques du Nord (France)	5
664	Beyaert (P.)	Railways économiques de Liége-Seraing et extensions (Belgium)	3 & 5
361	Bianchi (G.)	Chemins de fer de l'État (Italy)	2
709	Binder (B. H.)	Entre Rios Railways (Argentine)	5
851	Biscoe (W. T.)	North Western Railway (India)	3
602	Blyton (P. G.)	Iraq State Railways (Mesopotamia)	1
191	Boag (G. L.)	Great Southern of Spain Railway	3 & 4
343	Boalth (V. H.)	North Western Railway (India)	2, 3, 4 & 5
744	Bobby (A. S.)	Ceylon Government Railway	2, 3 & 4
663	Boël (R.)	Chemin de fer de Braine-le-Comte à Gand (Belgium)	1, 2 & 3
186	Boix (F.)	Chemins de fer du Nord de l'Espagne	2, 3 & 4
533	Bolter (A. E.)	Great Western Railway (Great Britain)	2, 3 & 4
369	Bombrini (C. R.)	Chemin de fer Salentine (Italy)	1, 2 & 3
337	Bonham-Carter (Lt.col. H.).	Madras & Southern Mahratta Railway (India)	1, 2 & 3
497	Bouché-Leclercq	Chemins de fer de l'Est (France)	1
835	Bourne (G. L.)	New York Central Lines (United States of America)	2 & 4
255	Bouteau (M.)	Compagnie Générale des chemins de fer vicinaux (France)	5
571	Bowyer (J. C.)	Railway Clearing House (Great Britain)	4
999	Boyd (H. H.)	Quebec Central Railway (Canada)	2, 3 & 4
1007	Boyer (L. J.)	Buenos Ayres Great Southern Railway (Argentine)	3, 4 & 5
11	Braem (A.)	Permanent Commission of the Association, Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	4 & 5
57	Brant (F. A.)	Permanent Commission of the Association (English section) and Southern Railway (Great Britain)	3 & 4
859	Bravo (H. P. P.) (Junior)	Chemins de fer de l'Etat dans les colonies (Portugal)	2, 3 & 4
197	Breaud	Chemins de fer de l'Etat (France)	1, 2, 3, 4 & 5
590	Brereton (A.)	South Indian Railway (India)	3 & 4
499	Brévillé (L.)	Chemin de fer du Nord (France)	1, 2 & 3
523	Brocklebank (Sir Aubrey)	Great Western Railway (Great Britain)	3 & 4
31	Brooke (J. R.)	Permanent Commission of the Association	4
74	Brown (C. J.)	London & North Eastern Railway (Great Britain)	1, 4 & 5
998	Brown (Sir George McLaren).	Quebec Central Railway (Canada)	1, 4 & 5
786	Bruce-Joy (A. W.)	Great Indian Peninsula Railway (India)	2 & 3
110	Bruneau	Chemins de fer du Midi (France)	2, 3, 4 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
968	**Bull** (A. S.)	Sudan Government Railways and Steamers	3, 4 & 5
933	**Bulleid**, O.	Permanent Commission of the Association (section secretary)	1, 2 & 3
34	**Burgess** (The Right Hon. H. Givens).	Permanent Commission of the Association and London Midland & Scottish Railway (Great Britain)	1, 2, 3, 4 & 5
302	**Burt** (Sir Henry P.)	Bengal & North Western Railway (India)	1, 3, 4 & 5
585	**Burton** (E.)	Oudh & Rohilkhand Railway (India)	2 & 4
927	**Bush** (B. F.)	American Railway Association and Missouri Pacific Railroad (United States of America)	1, 2 & 3
470	**Bustinduy** (M.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	2 & 3
300	**Butler-Henderson** (The Hon. Eric Brand).	Permanent Commission of the Association (English section) and Great Central & Midland Joint Committee (Great Britain)	1, 2, 3, 4 & 5
558	**Byrom** (C. R.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3 & 4
427	**Cable** (G. R.)	Central Uruguay Railway of Monte Video	3 & 4
293	**Calder** (J.)	London & North Eastern Railway (Great Britain)	1, 3 & 4
320	**Calder** (N. D.)	Under Secretary of State for India	2, 3, 4 & 5
76	**Cambournac** (L.)	Chemin de fer du Nord (France)	1, 3 & 4
297	**Campion** (F. A.)	Great Northern Railway (Irish Free State)	1, 4 & 5
272	**Canat**	Chemins de fer algériens de la Compagnie de Paris à Lyon et à la Méditerranée	1, 3, 4 & 5
66	**Cane** (Arthur B.)	Permanent Commission of the Association (English section)	4
620	**Cantuniar**	Chemins de fer de l'Etat (Roumania)	2
318	**Cardew** (D.)	Eastern Bengal Railway (India)	2, 3 & 5
595	**Carmichael** (W.)	South Indian Railway (India)	3 & 4
475	**Carson** (H. M.)	Pennsylvania Railroad System (United States of America)	4 & 5
319	**Case** (R. C.)	Eastern Bengal Railway (India)	2, 3 & 4
161	**Caspar** (M^lle^)	Chemins de fer de l'Est brésilien	4 & 5
389	**Caspersz** (G. P. J.)	Tramways à vapeur Semarang-Cheribon (Dutch Indies)	1, 3 & 5
24	**Castel** (du)	Permanent Commission of the Association and Ministère des travaux publics (France)	2, 3 & 4
190	**Castellon** (F.)	Chemins de fer du Nord de l'Espagne	1 & 2
370	**Cataldi** (G. dei Baroni)	Chemin de fer Salentine (Italy)	1 & 2
13	**Caufriez**	Permanent Commission of the Association and Société nationale des chemins de fer vicinaux (Belgium)	4 & 5
185	**Caviedes** (Le marquis de)	Chemins de fer du Nord de l'Espagne	1, 2, 3 & 4
666	**Cayphas** (A.)	Compagnie belge de chemins de fer et d'entreprises	2, 3 & 4

Number.	NAME.	DELEGATED BY	SECTIONS.
158	**Cazenave** (E.)	Chemins de fer de l'Est brésilien	4
5	**Cecil** (The Right Hon. Sir Evelyn).	Permanent Commission of the Association and Southern Railway (Great Britain)	3 & 4
934	**Cerès** (F. H.)	Permanent Commission of the Association (section secretary)	2
935	**Chambers** (H.)	Permanent Commission of the Association (section secretary)	2
763	**Chardon**	Ministère des travaux publics (France).	4
652	**Chase** (A.)	Under Secretary of State for India	2, 3 & 4
914	**Chase** (Ch. Ed.)	Bengal-Nagpur Railway (India)	2, 3, 4 & 5
85	**Chenu**	Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	2
282	**Chenut** (L.)	Chemin de fer de Smyrne-Cassaba et prolongement (Asia Minor)	3 & 5
936	**Chevalier**	Permanent Commission of the Association (section secretary)	3
305	**Christian** (E.)	Bengal & North Western Railway (India)	4
32	**Churchill** (The Right Hon. Viscount).	Permanent Commission of the Association and Great Western Railway (Great Britain)	1, 2, 3, 4 & 5
768	**Claise**	Ministère des travaux publics (France)	1, 3 & 5
819	**Clark** (F. H.)	Ministère des communications (China)	1, 2, 3 & 4
123	**Clarke** (J. P.)	Buenos Ayres Great Southern Railway (Argentine)	1, 3, 4 & 5
923	**Clougher** (N.)	Canadian National Railways (Canada)	1 & 5
847	**Clow** (W.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	3, 4 & 5
103	**Clower** (W.)	London Midland & Scottish Railway (Great Britain)	3 & 4
582	**Coates** (J.)	Oudh & Rohilkhand Railway (India)	1, 3, 4 & 5
715	**Codrington** (W. M.)	Great Western of Brazil Railway	2 & 3
304	**Cohen** (L. L.)	Bengal & North Western Railway (India)	4
705	**Colens** (J.)	Ministère des chemins de fer, marine, postes et télégaphes (Belgium)	2, 4 & 5
574	**Collett** (A. S.)	South African Railways and Harbours (Africa)	3, 4 & 5
84	**Collett** (C. B.)	Great Western Railway (Great Britain)	2
573	**Collins** (Colonel R.)	South African Railways and Harbours (Africa)	2 & 5
109	**Collot** (C.)	Chemins de fer de l'Est (France)	3 & 4
3	**Colson** (C.)	Permanent Commission of the Association and Ministère des travaux publics (France)	3, 4 & 5
332	**Constable** (Col. W. V.)	Madras & Southern Mahratta Railway (India)	4
783	**Cooke** (T. F.)	County Donegal Railways Joint Committee (Irish Free State)	4 & 5
67	**Coomber** (W. H.)	London Midland & Scottish Railway (Great Britain)	1, 2 & 3

Number	NAME.	DELEGATED BY	SECTIONS.
96	Cooper (A. R.)	Underground Electric Railways Company of London (Great Britain)	1, 2 & 3
108	Cope (R.)	Great Western Railway (Great Britain)	4
229	Cordier (G.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	3 & 4
861	Cottier (Le Dr. R.)	Chemins de fer fédéraux (Switzerland).	4
799	Couvreur (R. da Costa)	Ministère du commerce et des communications (Portugal)	1, 2 & 4
219	Couvreux (P.)	Chemins de fer du Midi (France)	1 & 4
95	Cox (E. C.)	Southern Railway (Great Britain)	3
793	Crawford (D. F.)	Department of State (United States of America)	2, 3 & 5
512	Crépin (G.)	Compagnie générale des voies ferrées d'intérêt local (France)	4 & 5
823	Crombé (G.)	Société générale de chemins de fer économiques (Belgium)	2 & 5
73	Cushing (W. C.)	Pennsylvania Railroad System (United States of America)	1 & 3
692	Czapski (W.)	Ministère des chemins de fer and Chemins de fer de l'Etat (Poland)	3
170	Damm (L.)	Chemin de fer de Lolland-Falster (Denmark)	4
521	Dattée (F.)	Compagnie fermière des chemins de fer tunisiens	2, 3 & 4
502	Dautry (R.)	Chemin de fer du Nord (France)	1
292	Davidson (G.)	London & North Eastern Railway (Great Britain)	1, 3 & 4
838	Davies (A.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3, 4 & 5
524	Davies (D.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	3
1013	Davis (J.)	Agent General for New South Wales in London (New South Wales)	1, 2 & 5
446	Debarsy	Société nationale des chemins de fer vicinaux (Belgium)	1, 3 & 5
100	De Benedetti (C.)	Chemins de fer de l'Etat (Italy)	1 & 3
907	De Benedetti (V.)	Ministère des travaux publics (Italy)	1, 4 & 5
519	Debize (R.)	Compagnie fermière des chemins de fer tunisiens	2 & 5
118	De Croës	Société nationale des chemins de fer vicinaux (Belgium)	2, 4 & 5
373	Defacqz (C.)	Tramways interprovinciaux Milan-Bergame-Crémone (Italy)	2 & 5
778	Defrance (P.)	Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	4
249	Delille (A.)	Société générale des chemins de fer économiques (France)	5
35	Dent (Sir Francis)	Permanent Commission of the Association and Southern Railway (Great Britain)	3, 4 & 5
789	Denti (E.)	Fédération des transports (Italy)	3, 4 & 5

Number.	NAME.	DELEGATED BY .	SECTIONS.
937	**Depoorter**	Permanent Commission of the Association (section secretary)	1
495	**Descubes** (A.)	Chemins de fer de l'Est (France) . . .	1 & 3
50	**Desprets** (R.)	Permanent Commission of the Association	1 & 3
591	**Deuchars** (G.)	South Indian Railway (India)	1, 4 & 5
70	**Deyl** (H.)	Chemins de fer de l'Etat (Czechoslovakia)	1 & 4
711	**D'Hanens** (E.)	Chemin de fer de Malines-Terneuzen (Belgium)	4
177	**D'Hertoghe** (J.)	Compagnie générale de chemins de fer Catalans (Spain)	4
483	**Dice** (A. T.)	Reading Company (United States of America)	3 & 4
990	**Dickson** (D. D.)	Pittsburgh, Shawmut & Northern Railroad (United States of America) . .	1, 2, 4 & 5
701	**Diniz** (P. J.)	Compagnie des chemins de fer portugais and Compagnie nationale des chemins de fer portugais	2, 4 & 5
97	**Direz** (A.)	Chemins de fer de l'Etat (France) . .	1, 3 & 4
1011	**Djouritchitch** (B.)	Ministère des communications (Yugo-Slavia)	2 & 3
601	**Dodge** (F. C.)	Iraq State Railways (Mesopotamia). .	3 & 5
431	**Donner** (O.)	Ministère des communications et des travaux publics (Finland)	1, 2, 3, 4& 5
608	**D'Onofrio** (F.)	Fédération des transports (Italy) . .	3, 4 & 5
929	**Doswell** (G. A.)	Entre Rios Railways (Argentine) . .	4
203	**Dreyfuss** (J.)	Chemins de fer de l'Etat (France). . .	1 & 4
960	**Drury** (J. H.)	Leopoldina Railway (Brazil)	1, 2, 3 & 4
492	**Duchatel** (E.)	Chemins de fer de l'Est (France) . . .	1, 2 & 3
423	**Dufour** (P. Th.)	Chemin de fer de Lausanne à Ouchy (Switzerland)	2, 3 & 4
780	**Dunn** (S. O.)	American Railway Association (United States of America)	3 & 4
189	**Dupont** (A.)	Chemins de fer du Nord de l'Espagne .	1 & 4
274	**Durandeau** (L.)	Compagnie des phosphates et du chemin de fer de Gafsa (Tunis)	1, 2 & 5
253	**Duriez** (A.)	Chemins de fer économiques du Nord (France)	5
691	**Eberhardt** (J.)	Ministère des chemins de fer and Chemins de fer de l'Etat (Poland) . . .	4
995	**Echeverria** (V.)	Ministère des voies et communications (Chili)	1, 2, 3, 4 & 5
822	**Eckhard** (K. N.)	Central Argentine Railway (Argentine)	1, 2 & 3
844	**Edwards** (C. L.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	1, 2 & 4
326	**Edwards** (P. A.)	Great Indian Peninsula Railway (India)	2 & 3
354	**Ehrenfreund** (E.)	Chemins de fer de l'Etat (Italy) . . .	1, 2, 3 & 4
576	**Elias** (D. H.)	Uganda Railway (Africa)	2, 3, 4 & 5
572	**Eliot** (The Hon. Edward Granville).	Railway Clearing House (Great Britain)	4
849	**Elliott** (G. G.)	South African Railways and Harbours (Africa)	1, 2 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
979	**Ellson** (G.)	Southern Railway (Great Britain)	1
938	**Engel** (F.)	Permanent Commission of the Association (section secretary)	4
94	**Epinay** (C. V. E.)	Chemin de fer de Paris à Orléans (France)	2, 3 & 4
355	**Ermolli** (L.)	Chemins de fer de l'Etat (Italy)	3 & 4
208	**Ertzbischoff** (A.)	Chemins de fer d'Alsace et de Lorraine	3 & 4
614	**Esmark** (D. L.)	Chemins de fer de l'Etat (Norway)	1 & 3
415	**Etter** (H.)	Chemins de fer fédéraux (Switzerland)	1
853	**Evans** (A. O.)	Oudh & Rohilkhand Railway (India)	3 & 4
328	**Everett** (G. E.)	Great Indian Peninsula Railway (India)	1 & 3
36	**Fabris** (A.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Italy)	1 & 2
286	**Faringdon** (Hon. Lord)	London & North Eastern Railway (Great Britain)	1, 3 & 4
433	**Favière** (P. A.)	Direction générale des travaux publics (Tunis)	1, 3 & 5
340	**Fawcett** (J. F.)	Madras & Southern Mahratta Railway (India)	3, 4 & 5
800	**Fay** (Sir Sam)	Buenos Ayres Great Southern Railway (Argentine)	2, 3 & 5
742	**Felix** (J. J. P.)	Ceylon Government Railway	3, 4 & 5
395	**Ferreira** (A. V.)	Compagnie des chemins de fer portugais.	1, 2 & 4
540	**Fielden** (E. B.)	London Midland & Scottish Railway (Great Britain)	1 & 3
824	**Finnis** (D. R.)	Taltal Railway (Chili)	4
37	**Fiori** (F.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Italy)	1, 2 & 4
704	**Fisher** (R. F.)	North Western of Uruguay Railway	4
1002	**Fitzpatrick** (F. F.)	Missouri Pacific Railroad (United States of America)	4
456	**Floor** (A.)	Chemins de fer de l'Etat (Denmark)	2
621	**Fogelmarck** (Hj.)	Chemins de fer de l'Etat (Sweden)	1 & 2
93	**Follows** (J. H.)	London Midland & Scottish Railway (Great Britain)	3
25	**Fontaneilles**	Permanent Commission of the Association and Ministère des travaux publics (France)	2, 3, 4 & 5
684	**Forbes** (H.)	County Donegal Railways Joint Committee (Irish Free State)	5
863	**Forbes** (Sir William)	Permanent Commission of the Association (English section)	3
534	**Ford** (E.)	Great Western Railway (Great Britain)	2, 3, 4 & 5
748	**Forde** (Sir Henry)	Great Southern Railways (Irish Free State)	1 & 2
720	**Forster** (H. J.)	American Railway Association (United States of America)	1, 2, 3, 4 & 5
91	**Forte** (G.)	Chemins de fer de l'Etat (Italy)	2, 4 & 5
10	**Foulon** (E.)	Permanent Commission of the Association, Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	1, 3 & 4

Number.	NAME.	DELEGATED BY	SECTIONS.
58	**Fowler** (Sir Henry) . . .	Permanent Commission of the Association and London Midland & Scottish Railway (Great Britain)	1, 2, 3 & 4
842	**Fraser** (W. A.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	1
949	**Freeland** (Major-General Sir H. F. E.).	Bombay, Baroda & Central India Railway (India)	3, 4 & 5
623	**Friesen** (E. von)	Chemins de fer de l'Etat (Sweden) . .	1 & 5
904	**Friis-Skotte** (J. F. N.) . .	Ministère des travaux publics (Denmark).	1 & 5
900	**Fuortes** (G. C.)	Société pour les chemins de fer complémentaires de la Sardaigne (Italy) . .	1, 2, 3, 4 & 5
821	**Fuster y Tomas** (J.) . .	Ministère du fomento (Spain)	1, 2 & 3
777	**Gaeremynck** (O.)	Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	3 & 4
290	**Galloway** (Col. Wm. J.) . .	London & North Eastern Railway (Great Britain)	2, 3 & 4
926	**Garcia-Lomas** (J.)	Chemins de fer du Nord de l'Espagne .	2, 3 & 4
187	**Garre** (E.)	Chemins de fer du Nord de l'Espagne .	2 & 5
447	**Gevaert**	Société nationale des chemins de fer vicinaux (Belgium)	2, 4 & 5
756	**Ghilain** (P.)	Permanent Commission of the Association	1 & 4
59	**Gibson** (A. L.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	4
857	**Gieysztor** (J.)	Chemins de fer de l'Etat (Poland) . .	4
820	**Gil Clemente** (J.)	Ministère du fomento (Spain)	1, 4 & 5
153	**Gillet** (P.)	Chemin de fer du Bas-Congo au Katanga	1, 2 & 5
38	**Gioppo** (R.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Italy)	1 & 2
375	**Giovanola** (P.)	Chemin de fer du Tessin (Italy) . . .	1, 4 & 5
362	**Giovene** (N.)	Chemins de fer de l'Etat (Italy) . . .	1, 2 & 4
488	**Girod de l'Ain** (M.) . . .	Chemins de fer de l'Est (France) . . .	3 & 4
531	**Glanely** (The Right Hon. Lord).	Great Western Railway (Great Britain)	3 & 4
298	**Glover** (G. T.)	Great Northern Railway (Irish Free State)	2 & 5
220	**Godard**	Chemins de fer du Midi (France) . . .	1 & 4
661	**Goddard** (P.)	Central Argentine Railway (Argentine)	3, 4 & 5
781	**Godfernaux** (R.)	Chemins de fer de Dakar à Saint-Louis (Africa)	5
330	**Goldney** (A. P.)	Great Indian Peninsula Railway (India)	3, 4 & 5
577	**Goodship** (H. E.)	Uganda Railway (Africa)	3, 4 & 5
347	**Gordon** (Captain R. E.) . .	North Western Railway (India) . . .	1
721	**Gore** (E. B.)	Delaware & Hudson Company (United States of America)	1, 2, 3 & 4
414	**Gorjat** (E.)	Chemins de fer Fédéraux (Switzerland).	3 & 4
882	**Gosling** (H.)	British Government	1, 2, 3, 4 & 5
240	**Goyard** (F.)	Chemins de fer départementaux (France)	1 & 5
458	**Graae** (J. J.)	Chemins de fer de l'Etat (Denmark) . .	1, 4 & 5
331	**Graham** (H. J.)	Great Indian Peninsula Railway (India)	3, 4 & 5

Number	NAME.	DELEGATED BY.	SECTIONS.
638	Grandinson (W.)	Chemin de fer Stockholm-Vesteras-Bergslagen (Sweden)	1 & 2
33	Granet (Sir William Guy).	Permanent Commission of the Association and London Midland & Scottish Railway (Great Britain)	1, 2, 3, 4 & 5
43	Granholm (A.)	Permanent Commission of the Association, Ministère de l'Intérieur and Chemins de fer de l'Etat (Sweden)	1, 2, 3 & 4
879	Gray (A. W.)	British Government	3 & 4
294	Gresley (H. N.)	London & North Eastern Railway (Great Britain)	2 & 3
439	Grey (N. F. E.)	Buenos Ayres Great Southern Railway (Argentine)	3, 4 & 5
599	Griffin (A. C.)	Iraq State Railways (Mesopotamia)	3, 4 & 5
832	Grimshaw, (W. E.)	Lehigh Valley Railroad (United States of America)	2
442	Griolet (M.)	Chemin de fer du Nord français (lignes Nord-Belges) (Belgium)	3, 4 & 5
984	Gruson (P.)	Chemins de fer de l'Est (France)	3 & 4
688	Guastalla (E.)	Société Emilienne de chemins de fer, tramways et automobiles (Italy)	2 & 5
215	Gufflet	Chemins de fer du Midi (France)	3 & 4
49	Habran (J.)	Permanent Commission of the Association	3 & 4
238	Hachon	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	1 & 2
511	Hagneaux (A.)	Compagnie générale des voies ferrées d'intérêt local (France)	1, 3, 4 & 5
341	Hales (T. C.)	North Western Railway (India)	3, 4 & 5
867	Hall (Major G. L.)	Ministry of Transport (Great Britain)	1, 2 & 3
901	Hallberg (Doctor I.)	Chemin de fer Västergötland-Göteborg (Sweden)	4
834	Hardin (F. H.)	New York Central Railroad (United States of America)	2, 3 & 4
713	Harper (H.)	Great Western of Brazil Railway	3 & 4
124	Harper (Lt.-col. R. Tristram).	Buenos Ayres Great Southern Railway (Argentine)	3, 4 & 5
939	Harper (W. H.)	Permanent Commission of the Association (section secretary)	4
833	Harwood (G. A.)	New York Central Railroad (United States of America)	1, 3, 4 & 5
645	Hauer (J.)	Chemins de fer de l'Etat (Czechoslovakia)	1, 3 & 4
924	Haynes (J.)	Canadian National Railways (Canada)	2
741	Head (E. W.)	Ceylon Government Railway	2, 3, 4 & 5
434	Heiberg (E.)	Ministère des travaux publics and Chemins de fer de l'Etat (Norway)	2, 3 & 4
648	Helweg (H. L.)	Ministère des travaux publics (Denmark)	1 & 5
503	Hemery (G.)	Chemin de fer du Nord (France)	1, 2 & 3
125	Henderson (Sir Brodie)	Buenos Ayres Great Southern Railway (Argentine)	1, 2 & 5
424	Henderson (F.)	Central Uruguay Railway of Monte Video	3 & 4
129	Henderson (Hon. Ph.)	Buenos Ayres Western Railway (Argentine)	1, 2 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
496	**Henry** (A.)	Chemins de fer de l'Est (France)	1 & 4
225	**Henry-Gréard** (O.)	Chemin de fer de Paris à Orléans (France)	3 & 4
597	**Henshaw** (P. H.)	Federated Malay States Railways	3 & 5
53	**Heremans** (E.)	Permanent Commission of the Association (office of the Committee)	3 & 4
468	**Hériz** (E.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	3
44	**Herold** (Dr. R.)	Permanent Commission of the Association and Département fédéral des chemins de fer (Switzerland)	3 & 4
920	**Hicks** (G. A.)	Burma Railways (India)	1, 3, 4 & 5
426	**Higgins** (W.)	Central Uruguay Railway of Monte Video	3 & 4
685	**Higham** (R.)	Gold Coast Government Railways (Africa)	1, 3, 4 & 5
409	**Hildebrand** (Major E.)	Chemin de fer Norra-Bergslagen (Sweden)	1 & 3
575	**Hill** (W. G. J.)	South African Railways and Harbours (Africa)	3, 4 & 5
883	**Hindley** (C. D. M.)	Under Secretary of State for India	3, 4 & 5
633	**Hjortzberg** (Y.)	Chemin de fer Nässjö-Oskarshamn (Sweden)	1 & 4
964	**Hodgson** (C. G.)	Sudan Government Railways and Steamers	2 & 5
383	**Hoekstra** (H. E.)	Chemins de fer néerlandais (Holland)	1, 2 & 3
48	**Holemans** (Ed.)	Permanent Commission of the Association	3 & 4
543	**Holland-Hibbert** (The Hon. Arthur Henry).	London Midland & Scottish Railway (Great Britain)	3 & 4
953	**Holloway** (B. E.)	Secrétariat des communications et des travaux publics (Mexico)	1, 2, 3 & 4
401	**Holmgren** (S.)	Blekinge Kustbanor (Sweden)	1 & 5
779	**Holt** (F.)	Great Western of Brazil Railway	1 & 2
743	**Hooper** (G. E.)	Ceylon Government Railway	1, 2, 3 & 5
840	**Hornsby** (T.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	3, 4 & 5
1001	**Howard** (C.)	Missouri Pacific Railroad (United States of America)	1, 2, 3, 4 & 5
535	**Hubbard** (A. G.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	3, 4 & 5
917	**Hughes** (F. S.)	Bengal-Nagpur Railway (India)	1 & 5
556	**Hughes** (G.)	London Midland & Scottish Railway (Great Britain)	2
972	**Humphrey** (A. L.)	Department of State (United States of America)	2 & 3
808	**Hungerford** (S. J.)	Canadian National Railways (Canada)	2, 3 & 4
554	**Hunt** (S. H.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3
119	**Hunziker** (H.)	Département fédéral des chemins de fer (Switzerland)	1 & 3

Number.	NAME.	DELEGATED BY	SECTIONS.
864	Hurcomb (C. W.)	Ministry of Transport (Great Britain)	3, 4 & 5
790	Ikeda (K.)	Permanent Commission of the Association and Ministère des communications (Japan)	2, 3 & 4
526	Inchcape (The Right Hon. Viscount).	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	2 & 3
1005	Ingram (J.)	Free State of Ireland Government	3, 4 & 5
537	Insell (R. J.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	1 & 4
551	Irwin (R. C.)	London Midland & Scottish Railway (Great Britain)	2, 3 & 4
544	Ismay (J. B.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3
673	Ito (S.)	South Manchuria Railway (China)	2 & 3
675	Ito (T.)	South Manchuria Railway (China)	5
885	Ito (T.)	Ministère des communications (Japan)	3 & 5
814	Izat (Lt.-col. W. R.)	Bengal & North Western Railway and Rohilkund & Kumaon Railway (India)	1, 2, 3 & 4
207	Jac (F.)	Chemins de fer d'Alsace et de Lorraine	4
749	Jackson (A.)	Great Southern Railways (Irish Free State)	2, 4 & 5
525	Jackson (Sir Henry Mather)	Great Western Railway (Great Britain)	3, 4 & 5
451	Jacobs (L.)	Société nationale des chemins de fer vicinaux (Belgium)	4 & 5
954	Jadot (L.)	Chemin de fer du Bas-Congo au Katanga	1, 4 & 5
316	Janson (V. T.)	Eastern Bengal Railway (India)	1 & 3
485	Jansson (V.)	Chemins de fer de l'Etat (Finland)	1, 2 & 3
234	Japiot (M.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2 & 4
28	Javary (P. E.)	Permanent Commission of the Association and Chemin de fer du Nord (France)	2, 3 & 4
644	Jeanneret (E.)	Chemin de fer Yverdon-Sainte-Croix (Switzerland)	2 & 5
880	Jepson (W. A.)	British Government	1, 2, 3, 4 & 5
981	Johnson (H. O.)	Chemin de fer de Norrköping-Söderköping-Vikbolandets (Sweden)	2
402	Johnson (J.)	Chemin de fer Frövi-Ludvika (Sweden)	1, 2 & 3
564	Jones (H.)	Southern Railway (Great Britain)	2 & 3
385	Jorissen (T. M. F. C.)	Chemins de fer néerlandais (Holland)	1, 3 & 4
270	Jourdain (A.)	Chemins de fer algériens de la Compagnie de Paris à Lyon et à la Méditerranée	1, 2 & 3
508	Jourdain (P.)	Chemins de fer secondaires du Nord-Est (France)	1, 4 & 5
227	Jullien (C.)	Chemin de fer de Paris à Orléans (France)	1, 3 & 4
254	Just (le docteur A.)	Chemins de fer de la Provence (France)	2 & 5
613	Jynge (A. G.)	Chemins de fer de l'Etat (Norway)	4
438	Kabes (E.)	Ministère des chemins de fer and Chemins de fer de l'Etat (Czechoslovakia)	2, 3 & 4
670	Kaga (T.)	South Manchuria Railway (China)	1

Number.	NAME.	DELEGATED BY	SECTIONS.
889	**Kagayama** (M.)	Ministère des communications (Japan)	1 & 5
382	**Kalff** (J. A.)	Chemins de fer néerlandais (Holland)	1, 3 & 4
538	**Kay** (J. A.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	3, 4 & 5
921	**Kendall** (W.)	Burma Railways (India)	3, 4 & 5
750	**Keogh** (M. F.)	Great Southern Railways (Irish Free State)	1, 2 & 3
545	**Ker** (C.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	1, 2, 3, 4 & 5
168	**Kier** (F.)	Chemins de fer de la Fionie méridionale (Denmark)	1 & 4
940	**King-Stephens** (H. C.)	Permanent Commission of the Association (section secretary)	3
107	**Kirkus** (A. E.)	Permanent Commission of the Association (reporter)	2, 3, 4 & 5
646	**Klatovsky** (R.)	Chemins de fer de l'Etat (Czechoslovakia)	2
893	**Kobayashi** (G.)	Ministère des communications (Japan)	2 & 3
887	**Kobayashi** (Y.)	Ministère des communications (Japan)	1, 3 & 4
693	**Kolakowski** (S.)	Chemins de fer de l'Etat (Poland)	3 & 4
890	**Koyama** (I.)	Ministère des communications (Japan)	1 & 2
46	**Kunz** (G.)	Permanent Commission of the Association and Chemins de fer des Alpes bernoises (Switzerland)	3 & 4
417	**Labhardt** (E.)	Chemins de fer fédéraux (Switzerland)	1, 4 & 5
226	**Lacoin** (M.)	Chemin de fer de Paris à Orléans (France)	1, 2 & 3
690	**Lagerwey** (J. K.)	Chemins de fer de l'Etat aux Indes néerlandaises (Dutch Indies)	1, 4 & 5
102	**Laigle**	Chemins de fer du Midi (France)	1 & 3
112	**Lamalle** (U.)	Permanent Commission of the Association, Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	1, 2, 3 & 4
504	**Lancrenon** (P.)	Chemin de fer du Nord (France)	1, 2 & 3
679	**Launay**	Chemins de fer de l'Afrique occidentale française	1, 2 & 5
60	**Lawrence of Kingsgate** (The Right. Hon. Lord).	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	2 & 4
505	**Le Besnerais** (R.)	Chemin de fer du Nord (France)	2, 3 & 4
218	**Leboucher** (P.)	Chemins de fer du Midi (France)	2
448	**Lembourg** (G.)	Société nationale des chemins de fer vicinaux (Belgium)	5
143	**Lepère** (A.)	Chemin de fer d'Eecloo à Bruges (Belgium)	4
510	**Level** (F.)	Compagnie générale des voies ferrées d'intérêt local (France)	2, 3, 4 & 5
251	**Level** (G.)	Société générale des chemins de fer économiques (France)	3, 4 & 5
702	**Leverve** (G.)	International Union of Railways	1, 3 & 4
443	**Levie** (M.)	Société nationale des chemins de fer vicinaux (Belgium)	5

Number.	NAME.	DELEGATED BY	SECTIONS.
394	**Lima Henriques** (A. de) . .	Compagnie des chemins de fer portugais	2, 3 & 4
312	**Lincoln** (N.)	Bombay, Baroda & Central India Ry. (India)	1, 3, 4 & 5
410	**Lindgren** (E. M.)	Chemin de fer de Norra Oestergötland (Sweden)	4 & 5
346	**Lines** (A.)	North Western Railway (India) . . .	1
941	**Livesey** (E.)	Permanent Commission of the Association (section secretary)	3
128	**Livesey** (Sir Harry) . . .	Buenos Ayres Western Railway (Argentine)	1, 2 & 5
536	**Lloyd** (J. C.)	Great Western Railway (Great Britain)	1 & 5
116	**Lo Balbo** (Dr. P.)	Tramways à vapeur Piémontais (Italy)	1, 3 & 5
416	**Locher** (Dr. E.)	Chemins de fer fédéraux (Switzerland).	2 & 4
881	**Locket** (G. C.)	British Government	3 & 4
561	**Loder** (G. W. E.)	Southern Railway (Great Britain) . .	2, 3 & 4
1008	**Loewenthal** (T.)	Buenos Ayres Great Southern Railway (Argentine)	4
622	**Löfmarck** (G.)	Chemins de fer de l'Etat (Sweden) . .	1 & 3
966	**Lord** (Major P. C.) . . .	Sudan Government Railways and Steamers	1 & 5
106	**Loree** (Colonel J. T.) . .	Delaware & Hudson Company (United States of America)	1, 2, 3 & 4
650	**Lunn** (E.)	Ministère des travaux publics (Denmark)	4
202	**Lutton** (G.)	Chemins de fer de l'Etat (France) . .	1
269	**Luuyt**	Chemins de fer algériens de la Compagnie de Paris à Lyon et à la Méditerranée	1, 2, 3 & 4
363	**Luzzati** (R.)	Chemin de fer du Nord de Milan (Italy)	2 & 5
72	**Maas-Geesteranus** (H. P.) .	Chemins de fer néerlandais (Holland) .	1 & 3
878	**Macassey** (Sir Lynden L.) .	British Government	3 & 4
908	**Maccallini** (L.)	Ministère des communications (Italy) .	1, 3 & 4
453	**Macdonald** (Lt.-col. A. C.) .	Nitrate Railways (Chili)	1, 4 & 5
950	**Machin** (S.)	British Government	1, 3 & 4
845	**Maclure** (W. G. P.) . . .	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	2, 3 & 4
888	**Maeda** (M.)	Ministère des communications (Japan) .	3 & 4
338	**Magniac** (Brig. gen. Sir Charles Lane).	Madras & Southern Mahratta Railway (India)	3
766	**Maison**	Ministère des travaux publics (France) .	1, 2 & 3
259	**Mallez** (L.)	Régie départementale des tramways de l'Ain (France)	5
117	**Mance** (Brig. gen. H. O.) .	Permanent Commission of the Association (reporter)	5
30	**Mange** (A.)	Permanent Commission of the Association and Chemin de fer de Paris à Orléans (France)	1, 2, 3 & 4
775	**Marchal** (S.)	Permanent Commission of the Association, Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium) . .	2
29	**Margot**	Permanent Commission of the Association and Chemins de fer de Paris à Lyon et à la Méditerranée (France) .	2 & 3

Number.	NAME.	DELEGATED BY	SECTIONS.
464	**Maristany** (C.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	1 & 4
19	**Maristany** (E.)	Permanent Commission of the Association and Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	3 & 4
113	**Marriott** (H.)	Permanent Commission of the Association (English section)	3, 4 & 5
339	**Marsh** (J. G. R.)	Madras & Southern Mahratta Railway (India)	1, 3, 4 & 5
839	**Marshall** (G.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	3 & 4
852	**Martin** (F. B.)	North Western Railway (India)	4
807	**Mason** (J.)	High Commissioner for the Dominion of New Zealand in London	1, 2, 3, 4 & 5
527	**Mason** (J. F.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	2 & 3
471	**Massó Casañas** (A.)	Chemins de fer de Medina del Campo à Zamora et Orense à Vigo (Spain)	1, 3 & 4
257	**Masson** (R.)	Compagnie générale des chemins de fer vicinaux (France)	5
550	**Matheson** (D. A.)	London Midland & Scottish Railway (Great Britain)	1, 3 & 4
583	**Mathews** (Major W. F.)	Oudh & Rohilkhand Railway (India)	1, 3, 4 & 5
418	**Matter** (E.)	Chemins de fer fédéraux (Switzerland)	1, 2 & 3
636	**Mattsson** (J. V.)	Chemin de fer de Norsholm-Westervick-Hultsfred (Sweden)	4 & 5
90	**Maunsell** (R. E. L.)	Southern Railway (Great Britain)	2
869	**Maybury** (Sir Henry)	Ministry of Transport (Great Britain)	1 & 5
61	**Maynard** (A.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	4
976	**McBride** (T. C.)	Department of State (United States of America)	2
714	**Medlycott** (A. J.)	Great Western of Brazil Railway	3, 4 & 5
970	**Mellini** (E.)	Chemins de fer complémentaires de la Sardaigne (Italy)	1 & 5
71	**Mendizabal** (D.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	1, 3 & 4
42	**Mereutza** (C.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Roumania)	1, 3 & 4
75	**Merklen** (J.)	Chemins de fer d'Alsace et de Lorraine	1, 3 & 4
250	**Michaut** (J.)	Société générale des chemins de fer économiques (France)	1, 2 & 5
963	**Midwinter** (E. C.)	Sudan Government Railways and Steamers	4 & 5
258	**Mielle** (H.)	Régie départementale des tramways de l'Ain (France)	5
528	**Mildmay of Flete** (The Right Hon. Lord).	Great Western Railway (Great Britain)	1, 3 & 5
736	**Miles** (H. P.)	Great Central & Midland Joint Committee (Great Britain)	1, 4 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
532	**Milne** (J.)	Great Western Railway (Great Britain)	1, 2, 3 & 4
894	**Minami** (H.)	Ministère des communications (Japan)	2 & 3
51	**Minsart** (E.)	Permanent Commission of the Association	1, 2 & 3
281	**Monod** (J. P.)	Chemin de fer de Smyrne-Cassaba et prolongement (Asia Minor)	3 & 4
699	**Monteiro** (R. S.)	Chemins de fer de l'Etat (Portugal)	1 & 4
1014	**Moore-Brabazon** (Lt.-col. J. T. C.).	British Government	1, 2, 3, 4 & 5
738	**Mosley** (H. V.)	Permanent Commission of the Association (English section) and Midland & Great Northern Railways Joint Committee (Great Britain)	2, 3 & 4
875	**Mott** (B.)	British Government	1 & 2
327	**Mould** (A. E.)	Great Indian Peninsula Railway (India)	1
868	**Mount** (Lieut.-col. A. H. L.)	Ministry of Transport (Great Britain)	1, 2 & 3
80	**Moutier** (E.)	Chemin de fer du Nord (France)	1, 3 & 4
501	**Moyrand** (A.)	Chemin de fer du Nord (France)	1, 3 & 4
975	**Muchnic** (C. H.)	Department of State and Missouri Pacific Railroad (United States of America)	2, 3, 4 & 5
231	**Mugniot** (E.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	3 & 4
589	**Muirhead** (A.)	South Indian Railway (India)	3 & 4
147	**Müntz** (J.)	Compagnie internationale des wagons-lits et des grands express européens (Belgium)	2, 3 & 4
886	**Nakagawa** (T.)	Ministère des communications (Japan)	3 & 4
891	**Nakayama** (C.)	Ministère des communications (Japan)	1 & 3
200	**Nasse**	Chemins de fer de l'Etat (France)	2, 4 & 5
397	**Navarro** (E. J.)	Chemins de fer de l'Etat dans les colonies (Portugal)	5
566	**Neachell** (E. J.)	Liverpool Overhead Railway (Great Britain)	1 & 2
916	**Neely** (Th. R.)	Bengal Nagpur Railway (India)	3, 4 & 5
942	**Neil** (L. H. K.)	Permanent Commission of the Association (section secretary)	5
411	**Nerell** (A.)	Chemin de fer Stockholm-Roslag (Sweden)	2, 3 & 4
906	**Netti** (A.)	Ministère des communications (Italy)	3, 4 & 5
303	**Neville** (E. A.)	Bengal & North Western Railway and Rohilkund & Kumaon Railway (India)	1, 3, 4 & 5
943	**Newbold** (A.)	Permanent Commission of the Association (section secretary)	5
476	**Newcomet** (H. E.)	Pennsylvania Railroad System (United States of America)	1
78	**Nicholls** (R. H.)	Great Western Railway (Great Britain)	3 & 5
356	**Nobili** (B.)	Chemins de fer de l'Etat (Italy)	2, 3 & 5
52	**Nollet** (E.)	Permanent Commission of the Association (office of the Committee)	2 & 4
398	**Norrby** (A.)	Chemin de fer Bergslagen (Sweden)	3, 4 & 5
629	**Norrman** (S.)	Chemins de fer de l'Etat (Sweden)	4 & 5
746	**Nugent** (Sir Walter R.)	Great Southern Railways (Irish Free State)	1, 3 & 4
639	**Nyström** (J.)	Chemin de fer Västergötland-Göteborg (Sweden)	1, 3 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
782	**Oates** (Wm. H.)	Cheshire Lines Committee (Great Britain)	2, 3 & 4
584	**O'Connor** (Lt.-col. M. S. S.)	Oudh & Rohilkhand Railway (India)	3, 4 & 5
344	**Ogle** (J. W.)	North Western Railway (India)	3
649	**Ollgaard** (B. K.)	Ministère des travaux publics (Denmark)	1 & 5
1009	**Orman** (F. W.)	Buenos Ayres Great Southern Railway (Argentine)	2, 3 & 5
607	**Ottone** (G.)	Société nationale de chemins de fer et de tramways and Fédération des transports (Italy)	2, 3 & 5
956	**Ottone** (L.)	Société nationale de chemins de fer et de tramways (Italy)	1, 4 & 5
825	**Ouang Hang**	Chemins de fer de l'Etat (ligne du Lung-Hai) (China)	1, 3 & 5
206	**Pader** (G.)	Chemins de fer d'Alsace et de Lorraine	3 & 4
570	**Painter** (E. E.)	Railway Clearing House (Great Britain)	4
407	**Pallin** (K. A.)	Chemins de fer Karlstad-Munkfors, Nordmarks-Klarelfvens, Filipstads Norra-Bergslagen (Sweden)	2, 3 & 4
522	**Palmer** (Sir S. Ernest)	Great Western Railway (Great Britain)	1, 2, 3 & 4
952	**Pani** (A.)	Secrétariat des communications et des travaux publics (Mexico)	1, 4 & 5
653	**Pantazis** (K.)	Ministère des communications, Chemins de fer de l'Etat and Chemins de fer Pirée-Athènes-Péloponèse (Greece)	1, 4 & 5
802	**Parish** (W. W.)	Taltal Railway (Chili)	3, 4 & 5
122	**Parish** (Lt.-col. W.)	Buenos Ayres Great Southern Railway (Argentine)	4 & 5
965	**Parker** (A. C.)	Sudan Government Railways and Steamers	4 & 5
719	**Parmelee** (Dr. J. H.)	American Railway Association (United States of America)	2, 4 & 5
228	**Parodi** (H.)	Chemin de fer de Paris à Orléans (France)	2, 4 & 5
27	**Paul** (J. R.)	Permanent Commission of the Association and Chemins de fer du Midi (France)	1, 2, 3 & 4
224	**Paul-Dubois** (F.)	Chemin de fer de Paris à Orléans (France)	1, 2, 3 & 4
619	**Paunescu**	Chemins de fer de l'Etat (Roumania)	2 & 4
856	**Pawlowski** (A.)	Chemins de fer de l'Etat (Poland)	2 & 4
198	**Payet** (P.)	Chemins de fer de l'Etat (France)	1, 3 & 4
81	**Pellarin** (E.)	Chemins de fer de l'Est (France)	1, 2 & 3
357	**Peretti** (E.)	Chemins de fer de l'Etat (Italy)	1, 2 & 4
204	**Perrier** (H.)	Chemins de fer de l'Etat (France)	1, 3 & 4
14	**Philippe** (G.)	Permanent Commission of the Association and Chemin de fer du Nord français (lignes Nord-belges) (Belgium)	3, 4 & 5
897	**Pick** (F.)	Permanent Commission of the Association (English section) and Underground Electric Railways Company of London (Great Britain)	3, 4 & 5
669	**Pickwoad** (W. A.)	Antofagasta (Chili) and Bolivia Railway	3 & 4

Number.	NAME.	DELEGATED BY.	SECTIONS.
176	**Pirard** (A.)	Compagnie générale de chemins de fer Catalans (Spain)	1, 2 & 5
199	**Polart** (Ch.)	Chemins de fer de l'Etat (France)	1, 3 & 4
62	**Pole** (Sir Felix J. C.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	1, 2, 3, 4 & 5
654	**Politis** (A.)	Ministère des communications (Greece).	3 & 4
494	**Poncet** (M.)	Chemins de fer de l'Est (France)	1, 2, 3 & 4
135	**Popkiss** (R.)	Cordoba Central Railway (Argentine).	1, 2, 3 & 4
1012	**Popovitch** (I.)	Ministère des communications (Yugo-Slavia)	1 & 4
703	**Pourcel** (A.)	International Union of Railways	2, 3 & 4
656	**Prakaskolasilp** (P.)	Ministère des voies de communication (Siam)	1 & 5
358	**Prandoni** (E.)	Chemins de fer de l'Etat (Italy)	1, 3 & 4
616	**Pretorian** (S.)	Chemins de fer de l'Etat (Roumania)	3, 4 & 5
569	**Price** (P. H.)	Railway Clearing House (Great Britain)	4
866	**Pringle** (Colonel Sir John).	Ministry of Transport (Great Britain).	1, 2 & 3
216	**Quarré** (L.)	Chemins de fer du Midi (France)	3 & 4
797	**Queiroz** (A. Teixeira de).	Ministère du commerce et des communications (Portugal)	1 & 3
237	**Quinquet**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	1
553	**Quirey** (J.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	4 & 5
263	**Raby** (E.)	Chemins de fer algériens de l'Etat	2 & 5
174	**Rahola Puignau** (S.)	Chemins de fer Andalous (Spain)	3
462	**Rammeskov** (Chr. A.)	Aalborg Privatbaner (Denmark)	1 & 5
876	**Raven** (Sir Vincent L.)	British Government	2, 4 & 5
435	**Ravenek** (J. G.)	Ministère du waterstaat (Holland)	1, 4 & 5
68	**Ray** (G. J.)	Delaware, Lackawanna & Western Railroad (United States of America)	1, 2, 3 & 4
871	**Redman** (Colonel A. S.)	War Office (Great Britain)	1, 2, 3 & 5
794	**Rego** (A. de Sousa)	Ministère du commerce et des communications (Portugal)	1 & 4
987	**Regusci** (A.)	Ministère des travaux publics (Uruguay)	1, 2, 3, 4 & 5
557	**Reid** (R. W.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	2, 3 & 4
1004	**Reis** (Dr. Aarão)	Ministère de l'industrie, des communications et des travaux publics (Brazil)	2, 3 & 5
491	**Renard** (R.)	Chemins de fer de l'Est (France)	3
989	**Reymond** (T.)	Chemins de fer de l'Etat (France)	1, 2, 3, 4 & 5
26	**Riboud**	Permanent Commission of the Association and Chemins de fer de l'Est (France)	1, 3 & 4
944	**Richardson** (T. H.)	Permanent Commission of the Association (section secretary)	1
642	**Richnau** (N.)	Chemin de fer Göteborg-Boras et Boras-Alfvesta (Sweden)	2 & 4
235	**Richon**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2 & 4

Number.	NAME.	DELEGATED BY	SECTIONS.
903	**Ricketts** (D. P.)	Ministère des communications (China)	1 & 2
751	**Riley** (C. E.)	Great Southern Railways (Irish Free State)	3 & 4
440	**Roberts** (Ch. H.)	Central Argentine Railway (Argentine)	1
474	**Roberts** (J. W.)	Pennsylvania Railroad System (United States of America)	3 & 4
333	**Robertson** (Col. Sir Donald)	Madras & Southern Mahratta Railway (India)	1, 3 & 4
945	**Robertson** (L. W. R.)	Permanent Commission of the Association (section secretary)	1
581	**Robey** (E. B.)	North Western Railway (India)	1 & 5
996	**Robinson** (B. M.)	Department of State (United States of America)	1, 2, 3, 4 & 5
946	**Roche** (C. E.)	Permanent Commission of the Association (section secretary)	1, 2, 3, 4 & 5
193	**Rose** (D.)	Central of Georgia Railway and Illinois Central Railroad (United States of America)	3 & 4
683	**Ross** (A. P.)	Cheshire Lines Committee (Great Britain)	1, 3 & 4
862	**Rousseau** (H.)	International Union of Railways	3, 4 & 5
865	**Rowntree** (E. W.)	Ministry of Transport (Great Britain)	4 & 5
210	**Regnauld** (C.)	Chemins de fer d'Alsace et de Lorraine	1 & 3
209	**Renevey** (C.)	Chemins de fer d'Alsace et de Lorraine	2
223	**Richemond** (P.)	Chemin de fer de Paris à Orléans (France)	2 & 4
767	**Rivet**	Ministère des travaux publics (France)	2 & 3
769	**Ruffi de Pontevès** (de)	Ministère des travaux publics (France)	2, 3 & 4
69	**Ruffieux** (G.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	1, 3, 4 & 5
635	**Rune** (A.)	Chemin de fer de Norsholm-Westervick-Hultsfred (Sweden)	4
617	**Russ** (A.)	Chemins de fer de l'Etat (Roumania)	3 & 4
895	**Sahlin** (E. G.)	Ministère de l'intérieur (Sweden)	4
487	**Sahlstein** (H.)	Chemins de fer de l'Etat (Finland)	1
992	**Salinas** (M.)	Ministère des voies et communications (Chili)	1, 2, 3, 4 & 5
378	**Salvadori** (G.)	Société turinoise de tramways et de chemins de fer économiques (Italy)	2 & 4
437	**Sandberg** (Ch. P.)	Ministère des voies de communication (Siam)	1, 2 & 5
902	**Sandberg** (O. F. A.)	Ministère des communications (China)	1, 2 & 5
948	**Santini** (L.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	4
244	**Sapin** (C.)	Chemins de fer départementaux du Tarn (France)	2, 3 & 5
180	**Satrústegui** (Le baron de)	Compagnie d'exploitation des chemins de fer de Madrid à Cacérès et au Portugal et Ouest de l'Espagne	2
955	**Schleiter** (Walter F.)	Department of State (United States of America)	4
413	**Schrafl** (A.)	Chemins de fer fédéraux (Switzerland)	1, 2 & 3
831	**Schrenk** (H. von)	Kansas City Southern Railway, New York Central Lines and New York, Chicago & St. Louis Railway (United States of America)	1 & 4

Number.	NAME	DELEGATED BY	SECTIONS.
764	Schwob	Ministère des travaux publics (France)	3 & 4
271	Séjourné	Chemins de fer algériens de la compagnie de Paris à Lyon et à la Méditerranée	1, 4 & 5
299	Selbie (R. H.)	Metropolitan Railway (Great Britain)	2, 3 & 4
846	Selway (C. J.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	3, 4 & 5
909	Semenza (G.)	Ministère des communications (Italy)	2 & 5
611	Semenza (M.)	Fédération des transports (Italy)	2, 3 & 5
430	Serjeant (J. C.)	Ministère des communications and Chemins de fer de l'Etat (Egypt)	1
805	Seydoux (E.)	Tramways de l'Indre (France)	3 & 5
313	Shakespear (W. A.)	Bombay, Baroda & Central India Railway (India)	1, 3, 4 & 5
307	Shelley (Major A. D. G.)	Bombay, Baroda & Central India Railway (India)	1, 3 & 4
896	Sherman (L. B.)	American Railway Association (United States of America)	1 & 2
676	Shima (E.)	South Manchuria Railway (China)	5
671	Shimizu (K.)	South Manchuria Railway (China)	1
752	Sides (J. F.)	Great Southern Railways (Irish Free State)	1 & 4
315	Sievwright (F. J. H.)	Bombay, Baroda & Central India Railway (India)	3 & 5
798	Silva (A. J. Estevao da)	Ministère du commerce et des communications (Portugal)	1 & 3
698	Silva (P. O. S.)	Chemins de fer de l'Etat (Portugal)	1, 3 & 4
918	Silver (J. R.)	Bengal & North Western Railway (India)	2, 3 & 4
792	Simmons (Col. E. A.)	Department of State (United States of America)	2 & 4
796	Simoës (J. M. de Oliveira)	Ministère du commerce et des communications (Portugal)	3 & 4
612	Simonetti (E.)	Fédération des transports (Italy)	2 & 3
82	Simon-Thomas (W.)	Chemins de fer néerlandais (Holland)	1, 3 & 4
322	Sims (E. A.)	Eastern Bengal Railway (India)	1, 3 & 4
562	Sire (H. A.)	Southern Railway (Great Britain)	4
329	Smart (C. N. B.)	Great Indian Peninsula Railway (India)	1, 3 & 4
848	Smeddle (J. H.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	2, 3 & 4
884	Smith (B. G.)	Under Secretary of State for India	1, 3 & 4
836	Smith (C. F.)	New York Central Railroad (United States of America)	3, 4 & 5
973	Smith (H. A.)	Department of State (United States of America)	1, 2, 3, 4 & 5
969	Smith (Roger)	Permanent Commission of the Association (English section)	2, 3 & 5
149	Snow (H. M.)	Compagnie internationale des wagons-lits et des grands express européens (Belgium)	2, 3 & 4
146	Snoy (Baron R.)	Compagnie internationale des wagons-lits et des grands express européens (Belgium)	3 & 4

Number.	NAME.	DELEGATED BY	SECTIONS.
17	**Soliman** (Abdul Hamid Pacha).	Permanent Commission of the Association, Ministère des communications and Chemins de fer de l'Etat (Egypt)	2 & 4
381	**Sorel** (A.)	Chemins de fer et minières Prince-Henri (Luxemburg)	2, 3 & 4
105	**Soulez** (E.)	Chemin de fer du Nord (France)	1, 2, 3 & 4
795	**Souza** (J. F. de)	Ministère du commerce et des communications (Portugal)	3, 4 & 5
961	**Gomes de Souza Leal** (J.)	Chemins de fer portugais de la Beira Alta	3
539	**Spiller** (H. H.)	Permanent Commission of the Association (English section) and Great Western Railway (Great Britain)	3, 4 & 5
874	**Spiller** (J. W.)	Crown Agents for the Colonies (Great Britain)	5
641	**Sprinchorn** (C.)	Chemin de fer Göteborg-Boras & Boras-Alfvesta (Sweden)	1 & 2
348	**Spurgeon** (C. E.)	North Western Railway (India)	2, 3, 4 & 5
406	**Stahle** (L. V.)	Chemin de fer Kalmar-Nya (Sweden)	1 & 3
659	**Stahle** (L. W.)	Ministère de l'Intérieur (Sweden)	2 & 5
922	**Steiner** (F.)	Chemins de fer fédéraux (Switzerland)	1, 2 & 5
295	**Stemp** (C. H.)	London & North Eastern Railway (Great Britain)	3 & 4
169	**Stensballe** (J. P.)	Chemins de fer de la Fionie méridionale (Denmark)	2, 3 & 5
565	**Stephens** (Lt.-col. H. F.)	Kent, Somerset & Shropshire Light Railway Group (Great Britain)	1, 3, 4 & 5
547	**Stockton** (Sir Edwin)	London Midland & Scottish Railway (Great Britain)	1, 2, 3 & 4
178	**Stoclet** (A.)	Chemin de fer central de Aragon (Spain)	2 & 3
618	**Stoïka** (V.)	Chemins de fer de l'Etat (Roumania)	1 & 4
986	**Storm** (J.)	Ministère des travaux publics (Uruguay)	1, 2, 3, 4 & 5
816	**Storsand** (O.)	Chemin de fer de Oslo à Eidsvold (Norway)	2
841	**Strang** (M. S.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	4
563	**Szlumper** (A. W.)	Southern Railway (Great Britain)	1 & 2
39	**Tajani** (F.)	Permanent Commission of the Association and Fédération des transports (Italy)	3, 4 & 5
260	**Tartary** (G.)	Tramways départementaux des Deux-Sèvres (France)	3 & 5
680	**Tatlow** (F.)	Permanent Commission of the Association (English section) and Cheshire Lines Committee (Great Britain)	3 & 4
712	**Tattam** (H.)	Great Western of Brazil Railway	3
977	**Taylor** (C. M.)	Reading Company (United States of America)	1, 3 & 4
818	**Tchéou-Weï**	Ministère des communications and Chemins de fer de l'Etat (China)	2 & 4
324	**Tedman** (C.)	Great Indian Peninsula Railway (India)	1
212	**Teissier** (G.)	Chemins de fer du Midi (France)	3, 4 & 5
697	**Teixeira** (F. P.)	Chemins de fer de l'Etat (Portugal)	3, 4 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
86	**Tête** (J.)	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2
500	**Tettelin** (F.)	Chemin de fer du Nord (France)	1 & 4
520	**This** (N.)	Compagnie fermière des chemins de fer tunisiens	2 & 5
898	**Thomas** (J. P.)	Underground Electric Railways Company of London (Great Britain)	2, 3 & 4
812	**Thompson** (W. S.)	Canadian National Railways (Canada)	4
787	**Thonet** (Ch.)	Tramways de Lombardie et Romagnes (Italy)	2 & 5
552	**Thornhill** (H. L.)	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	3 & 4
99	**Thorrowgood** (W. J.)	Southern Railway (Great Britain)	1, 3 & 4
405	**Thott** (baron A.)	Chemin de fer Helsingborg-Hessleholm (Sweden)	2, 3 & 4
167	**Tiemroth** (Chr.)	Chemins de fer de l'Est de Seeland (Denmark)	4
762	**Tissier** (T.)	Ministère des travaux publics (France)	3 & 4
892	**Tokunaga** (S.)	Ministère des communications (Japan)	2, 3 & 4
982	**Toller** (G. G. T.)	Burma Railways (India)	1, 3, 4 & 5
858	**Torres** (C. M. F.)	Chemins de fer de l'Etat dans les colonies (Portugal)	3, 4 & 5
359	**Tosti** (L.)	Chemins de fer de l'Etat (Italy)	2, 3 & 4
587	**Trelawny** (J. M. S.)	Oudh & Rohilkhand Railway (India)	1
555	**Trench** (E. F. C.)	London Midland & Scottish Railway (Great Britain)	1
1003	**Tritton** (Sir Seymour B.)	Madras & Southern Mahratta Railway (India)	2, 4 & 5
428	**Tubby** (H. O.)	Central Uruguay Railway of Monte Video	3 & 4
268	**Tujague** (H.)	Chemins de fer algériens de l'Etat	1, 2, 3, 4 & 5
567	**Turton** (E. R.)	Railway Clearing House (Great Britain)	4
461	**Tvenge** (H. C. M.)	Chemins de fer de l'Etat (Denmark)	1
593	**Tweedie** (F. F.)	South Indian Railway (India)	2
628	**Tydèn** (A.)	Chemins de fer de l'Etat (Sweden)	1
184	**Urquijo** (Le marquis de)	Chemins de fer du Nord de l'Espagne	2 & 4
18	**Valenciano y Mazerès** (A.)	Permanent Commission of the Association	3 & 4
201	**Valentin** (L.)	Chemins de fer de l'Etat (France)	2
460	**Valentiner** (G. C.)	Chemins de fer de l'Etat (Denmark)	1
233	**Vallantin**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2 & 4
815	**Vallecchi** (G.)	Fédération des transports (Italy)	3, 4 & 5
374	**Van den Savel** (J.)	Chemin de fer du Tessin (Italy)	3
925	**Van Leeuw** (L. C. M. J.)	Ministère des Colonies (Belgium)	5
978	**Vanni** (E.)	Chemins de fer de l'Etat (Italy)	4 & 5
450	**Van Noorbeeck**	Société nationale des chemins de fer vicinaux (Belgium)	1 & 5
387	**Van Reigersberg Versluys** (Chevalier J. C.)	Compagnie des chemins de fer des Indes néerlandaises (Dutch Indies)	1, 4 & 5
429	**Van Rijn** (J.)	Permanent Commission of the Association	1, 2 & 3
388	**Van Schouwenburg** (W. H.)	Compagnie des chemins de fer des Indes néerlandaises (Dutch Indies)	2, 3 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
441	Van Wassenaar (K. A.)	Central Argentine Railway (Argentine)	4
392	Vasconcellos Correia (A. de).	Compagnie des chemins de fer portugais	2, 3 & 4
104	Velani (L.)	Chemins de fer de l'Etat (Italy)	3
947	Velleman (Dr.)	Permanent Commission of the Association (section secretary)	1, 2, 3, 4 & 5
221	Vergé (C.)	Chemin de fer de Paris à Orléans (France)	3 & 4
436	Verhoop (D.)	Ministère du waterstaat (Holland)	2, 3 & 5
390	Vianna (L. F. da Silva)	Compagnie des chemins de fer portugais de la Beira Alta	4
548	Vickers (D.)	London Midland & Scottish Railway (Great Britain)	2 & 3
452	Viglione (O.)	Compagnie internationale des wagons-lits et des grands express européens (Belgium)	2, 3 & 4
837	Wagner (E.)	Compagnie fermière des chemins de fer tunisiens	1, 2 & 3
696	Wagner (J.)	Chemins de fer de l'Etat (Poland)	2, 4 & 5
79	Wagner (S. T.)	Reading Company (United States of America)	1, 2 & 3
63	Walker (Sir Herbert A.)	Permanent Commission of the Association (English section) and Southern Railway (Great Britain)	3 & 4
739	Walker (R. B.)	Midland & Great Northern Railways Joint Committee (Great Britain)	3 & 4
785	Wallace (W. K.)	London Midland & Scottish Railway Northern Counties Committee (Great Britain)	1, 2 & 3
631	Wallenberg (O.)	Chemin de fer Halmstad-Nässjö (Sweden)	1, 3 & 4
87	Wallis (J. T.)	Pennsylvania Railroad System (United States of America)	2
915	Walton (M.)	Bengal Nagpur Railway Company (India)	2
817	Wang (Dr. C. C.)	Ministère des communications and Chemins de fer de l'Etat (China)	4 & 5
809	Warren (A. E.)	Canadian National Railways (Canada)	1, 3 & 5
498	Waru (M. de)	Chemin de fer du Nord (France)	4
695	Wasiutynski (A.)	Chemins de fer de l'Etat (Poland)	1 & 3
843	Watson (H. A.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	3 & 5
64	Wedgwood (Sir Ralph Lewis).	Permanent Commission of the Association (English section) and London Midland & Scottish Railway (Great Britain)	2, 3 & 4
88	Weiss (M.)	Chemins de fer fédéraux (Switzerland)	2, 3 & 5
412	Wester (R.)	Chemin de fer de Uddevalla-Venersborg-Herrljunga (Sweden)	1 & 2
826	Whang Tsanhsi	Chemins de fer de l'Etat (ligne du Lung-Hai) (China)	3
662	Whelan (P. S.)	Central Argentine Railway (Argentine)	3, 4 & 5
899	White (H. G. N.)	Eastern Bengal Railway (India)	2 & 5

Number.	NAME.	DELEGATED BY	SECTIONS.
65	**Whitelaw** (Wm.)	Permanent Commission of the Association (English section) and London & North Eastern Railway (Great Britain)	2, 3 & 4
596	**Wigfall** (R. H.)	South Indian Railway (India)	4
77	**Willem** (J.)	Ministère des chemins de fer, marine, postes et télégraphes and Chemins de fer de l'Etat (Belgium)	1
325	**Williams** (A. E.)	Great Indian Peninsula Railway (India)	2 & 3
321	**Williams** (H. E.)	Eastern Bengal Railway (India)	3, 4 & 5
549	**Williams** (Sir Thomas)	London Midland & Scottish Railway (Great Britain)	4
872	**Williamson** (Brig. general F. H.).	General Post Office (Great Britain)	3, 4 & 5
708	**Williamson** (J.)	Entre Rios Railways (Argentine)	4
291	**Wilson** (A.)	London & North Eastern Railway (Great Britain)	3, 4 & 5
529	**Wilson** (The Right Hon. John W.).	Great Western Railway (Great Britain)	2 & 3
632	**Wiman** (A.)	Chemin de fer Halmstad-Nässjö (Sweden)	3 & 5
493	**Wisdorff** (H.)	Chemins de fer de l'Est (France)	1, 2, 3 & 4
459	**Wissenbach** (C. C.)	Chemins de fer de l'Etat (Denmark)	3
928	**Withington** (S.)	American Railway Association (United States of America)	2, 3 & 4
877	**Woodhouse** (W. B.)	British Government	2, 3 & 4
148	**Woytt** (F.)	Compagnie internationale des wagons-lits et des grands express européens (Belgium)	2, 3 & 4
804	**Yagimoto** (N.)	South Manchuria Railway (China)	2
674	**Yamaguchi** (J.)	South Manchuria Railway (China)	4
600	**Yates** (D. R. M.)	Iraq State Railways (Mesopotamia)	2 & 5
173	**Ymbern** (J.)	Chemins de fer Andalous (Spain)	1, 4 & 5
311	**Young** (S. G. S.)	Bombay, Baroda & Central India Railway (India)	3, 4 & 5
45	**Zingg** (J.)	Permanent Commission of the Association and Chemins de fer fédéraux (Switzerland)	4

OPENING CEREMONY

22 June 1925, at 3.0 p. m.

IN THE

LARGE HALL OF THE INSTITUTION OF CIVIL ENGINEERS, LONDON

H. R. H. THE DUKE OF YORK, acting on behalf of his brother H. R. H. the Prince of Wales, who was travelling abroad and who had accepted the Presidency of the tenth session of the International Railway Congress Association, took his place on the platform.

On his right were :

The Right Hon. Lieut. Col. Wilfred ASHLEY, M. P., Minister of Transport;

Mr. COLSON, vice-president of the Permanent Commission of the Association;

The Right Hon. Sir Evelyn CECIL, G. B. E.. M. P., member of the Permanent Commission;

Mr. Gustav BEHRENS, member of the Permanent Commission;

Mr. GHILAIN, general secretary of the Permanent Commission;

Sir Henry FOWLER, K. B. E., L. L. D., member of the Permanent Commission;

and on his left were :

Mr. FOULON, president of the Permanent Commission;

The Right Hon. Viscount CHURCHILL, G. C. V. O., chairman of the Great Western Railway, and member of the Permanent Commission;

Sir W. Guy GRANET, G. B. E., chairman of the London Midland & Scottish Railway, president of the Railway Companies' Association of England, and member of the Permanent Commission;

Mr. W. WHITELAW, chairman of the London & North Eastern Railway;

Brig. Gen. The Hon. Everard BARING, C. V. O., C. B. E., chairman of the Southern Railway;

The Right Hon. Lord ABERCONWAY, P. C., chairman of the Metropolitan Railway;

Mr. MARCHAL, vice-president of the Permanent Commission; and

Mr. HOLEMANS, secretary-treasurer of the Association.

On the platform were the principal Government Delegates and Members of the Permanent Commission.

H. R. H. THE DUKE OF YORK then addressed the delegates as follows :

« Gentlemen,

« It is my pleasant duty this afternoon to declare open this tenth session of the International Railway Congress. This duty I am glad to undertake on behalf of your President, my brother, The Prince of Wales; and I have been asked by him to express to you his sincere regret that unavoidable absence abroad prevents him being here to welcome you in person. I speak also in the name of The King who takes the greatest interest in your visit and in the object for which it has been arranged.

« On their behalf and on my own part I welcome to England, the birthplace of

railways, the delegates who have come from all parts of the world to attend this Congress.

« This is an historic occasion. One hundred years ago the first railway in the world — the Stockton and Darlington Railway — was opened in this country. On the badges which you all wear you will see a representation of the locomotive which drew the train on the opening day. Next week, if you are able to accept the hospitality of the London & North Eastern Railway, you will be able to see the locomotive itself and to trace the stages by which the powerful engines of the present day have developed from it.

« To England belongs the honour of setting an example of progress which other countries were not slow to follow. The development of railway systems in Europe and the opening up of the vast American Continent by railway enterprise are among the wonders of history. In addition to delegates from these Continents, we are glad to welcome here today representatives of countries whose railways were in their infancy when my grandfather, the late King Edward, opened the fifth session of this Congress.

« Such Conferences as these, having for their object the propagation of knowledge and exchange of experience, play an important part in the progress of the world. The practical advantages to be derived from the interchange of ideas which these discussions promote must be enormous, but as the success of such meetings depends to a very large extent upon the mutual confidence and goodwill of those who take part, another aspect of their utility is brought into prominence. They provide an opportunity for representatives of every nation to meet on a common ground, to get to know each other better, and to appreciate each other's point of view.

« In conclusion, I desire once more to welcome you on behalf of the Sovereign, the Country, and the British Railway Companies, and to express the hope that you will find your visit as enjoyable and full of interest as it is certain to be fertile in scientific results. » (*Prolonged applause.*)

Mr. Foulon, president of the Permanent Commission, replied as follows :

« May it please Your Royal Highness,

« It is my duty, on behalf of all the delegates to the tenth session of the International Railway Congress to express most respectfully to His Majesty The King, to His Royal Highness the Prince of Wales, and to Your Royal Highness our profound gratitude for the gracious welcome which has been accorded us.

« His Royal Highness the Prince of Wales has graciously consented to accept the presidency of the session, and you, Sir, have expressed in high terms, your regard for our work and for its influence on the progress of the world. These demonstrations of interest and sympathy on the part of the Royal Family are keenly appreciated by the delegates, who have gathered here from all parts of the world, and we wish to express to Your Royal Highness our sincerest gratitude.

« We also desire to present our warmest thanks to His Majesty's Government who, as represented by the Minister of Transport, have been of such great assistance in promoting the success of this Congress. (*Applause.*)

« At the final session of the Rome Congress it was decided, in agreement with the Spanish Government, that the following session should be held at Madrid in 1927.

Opening Ceremony of the tenth session of the Congress under the Presidency of H. R. H. the Duke of York, in the Large Hall of the Institution of Civil Engineers, on 22 June 1925.

View of the Large Hall of the Institution of Civil Engineers during the Opening Ceremony of the tenth session, on 22 June 1925.

« Subsequently our British colleagues expressed a wish to hold a Congress in London in 1925, to coincide with the celebration of the centenary of the opening of the first railway line in the world opened for public traffic.

« The Spanish Government, when approached regarding the postponement until 1930 of the session to be held in Spain, wholeheartedly concurred with the suggestion, and the project of our British colleagues met with cordial and general approval.

« What other conclusion could we have come to?

« The invention which we owe the genius of George Stephenson is, of all those which have been introduced into the world, the one which has had the greatest influence upon the lives of nations and upon the development of civilisation.

« The inauguration in 1825 of the Stockton & Darlington line indicated the starting-point of a far-reaching evolution in the means of transport and production, and also in international relations.

« The invention was very soon applied in Continental Europe and other countries of the world, and was everywhere welcomed with enthusiasm.

« With stupendous rapidity the whole surface of the globe was opened up by « Iron Roads »; to-day those lines total 7 600 000 miles, and we have witnessed a progressive development of railways as regards the power of locomotives, speed and safety.

« Let us pay homage to the memory of George Stephenson and the country of whom he is one of the most illustrious sons. (*Applause.*)

« The International Railway Congress Association, founded in 1885, has existed now for forty years.

« It brings into close relations the railway experts of the whole world, and its periodical conferences, by the opportunities which they give for comparing the results of experience and the exchange of observations made upon every type of system, promote continuous progress, both in the technical and administrative departments.

« The questions involved in railway working are numerous and complex and belong to well-defined categories.

« To facilitate the effective study of these questions by the highly qualified specialists who bring to our assistance their knowledge and talents, the Congress is subdivided into five sections, to which the following matters are respectively assigned :

Way and works;
Locomotives and rolling stock;
Working;
General matters;
Light railways and colonial railways.

« The principal questions which will be the subject of their deliberations on the occasion of the present Congress are :

1. Different methods of maintenance and repair of track. Comparison from technical and economical points of view;

2. Rails. Initial causes of breaking of rails. Rail joints; most economical and efficient arrangement;

3. Shunting and marshalling yards; lay-out and arrangement;

4. Reduction of the cost of traction;

5. High-speed electric locomotives;

6. Dispatching or control systems;

7. Fixed signals. — Principles of signalling for lines with dense traffic;

8. The eight-hour day on railways;

9. Method of establishing light railways or developing lines in new countries.

« The examination of all the questions has been prepared by the most complete and detailed reports drawn up by reporters chosen from among the most competent officials, whom I thank, on behalf of the Permanent Commission, for their valuable collaboration.

« I have the greatest pleasure in tendering our warmest thanks to the British Railway Companies, who have taken a great part in the organisation of the Congress, and who have spared no effort in their endeavours to render our visit to this country both pleasant and fruitful.

« In this respect, special mention is due to the Local Organisation Committee under the Chairmanship of the Right Honourable Viscount Churchill and to the very energetic members of the Executive Committee.

« Thanks to their initiative, their zeal, and to their appropriate choice of premises, they have contributed largely to the success of the present session.

« I also wish on behalf of the Permanent Commission to thank very warmly the Council of the Institution of Civil Engineers and the Council of the Institution of Mechanical Engineers for having placed at our disposal their large and beautiful buildings. (*Applause.*)

« Since the Rome Congress we have been obliged to record with deepest regret the resignation of our most honoured president of the Association. Mr. Tondelier, who resigned office because he is no longer an active official of the Belgian State Railways.

« I feel confident that the Congress will join me in expressing the deepest gratitude of the Association for the distinguished services he has rendered us. (*Applause.*)

« I must also pay a tribute of gratitude to Mr. Bruneel, a former very energetic vice-president of the Association, who has resigned. (*Applause.*)

« We have, in addition, suffered cruel losses by the deaths of Mr. Carlo Crova, general manager of the Italian State Railways, who presided with such distinction at the Congress at Rome in 1922;

of Mr. Stuyvesant Fish, president of the Washington session in 1905, and one of the principal authors of the success of that Congress;

of Messrs. Robert Winkler, Stieltjes, Dietler and Noblemaire, late Members of the Permanent Commission;

of Sir Hugh W. Drummond, member of the Local Organisation Commission of the tenth session;

and of Mr. Verdeyen, chief engineer to the Belgian State Railways, and general secretary to the Association, who devoted all his energies and all the faculties of his intellect to the exercise of these delicate functions.

« I desire to express our heartfelt respect to the memory of these distinguished and deeply regretted collaborators of our own organisation. (*Hear, hear.*)

« We shall continue the work to which these eminent men devoted themselves.

« On behalf of the Permanent Commission, I desire to express the wish that the London Session, which promises to be a most brilliant one, may be productive of results which will contribute to the solution of the important problems which are engaging the attention of the railway world and which concern the prosperity of all nations. » (*Prolonged applause.*)

The Right Hon. Lieut. Col. Wilfred Ashley, Minister of Transport, spoke as follows :

« Your Royal Highness,
« Your Excellencies,
« My Lords and Gentlemen,

« You have been welcomed by His Royal Highness the Duke of York, who has graciously consented to represent your President, H. R. H. the Prince of Wales, who at this moment is travelling in South Africa on a railway train provided by one of your members, the South African Railways Administration.

« The cordial sentiments which His Royal Highness has expressed to you are shared by all who recognise the great part which railways have taken in the development of the world's commerce.

« It is therefore with the greatest pleasure that His Majesty's Government extend their heartiest welcome to the tenth Session of the International Railway Congress Association.

« We fully recognise not only the interest but also the value to ourselves and to other countries of gatherings like this, gatherings of experts the fullest knowledge is brought together and the results of the widest experience acquired under great variety of conditions are interchanged. True science is always generous. The characteristic of the scientific man is the desire to communicate his knowledge to the general store and to advance the general progress.

« Your Association, as your President has just reminded you, celebrates to-day its fortieth anniversary, having had, as you know, its origin in a meeting of leading railway men of all countries, who were invited to Brussels in 1885 to celebrate the jubilee of Belgian Railways.

« In these forty years you have increased in strength with the development of railways until to-day you have a membership of no less than 235 administrations, representing 300 000 miles of line, and there is hardly a country from China to Peru which is not a member of your Association.

« The comprehensive character of the list of subjects for discussion at the Congress which your President has outlined reflects the enterprise which has characterised your Association since its inception. You have had prepared for you by the various authorities on the respective subjects most valuable reports on questions affecting the track, the locomotive, and the rolling stock and the various systems of traffic working. The human element has not been overlooked, and an opportunity is afforded of discussing the question of the eight-hour day in railway service.

« You have also provided for the discussion of light railways and colonial railways which mean so much to those countries which are being rapidly developed and where the traffic density is not at present sufficient to justify the expense of the construction of a standard track.

« Electric traction, now recognised as the most efficient method of dealing with the conveyance of the millions of workers of the great cities of the world, is considered in relation to its application to long-distance trains, a subject of the greatest interest at the present time.

« Finally, you will consider questions of statistics which are necessary in order that the efficiency and economy with which your railways are administered may be established beyond dispute.

« The importance of reducing transportation costs to the lowest possible degree can hardly be overestimated, and your discussions will undoubtedly prove helpful in this direction.

« With regard to the foreign delegates, His Majesty's Government will, so far as they can, do their best to make their stay in England both pleasant and profitable, recognising and appreciating that their presence with us at this time is due to their desire to associate with us in the British Railway Centenary celebrations which are taking place next week.

« His Majesty's Government also desire to associate themselves with the tribute to the memory of those distinguished members whose loss the Association has suffered since the last Congress. Their works are a memorial and an inspiration to those who follow them.

« This Tenth Congress, without doubt, will prove the vitality of your Association; and his Majesty's Government most heartily wish you all success and prosperity in your labours. » (*Prolonged applause.*)

The Right Hon. Viscount Churchill welcomed the delegates in the name of the British Railway Companies in the following terms :

« My Lords and Gentlemen,

« It affords me the greatest possible pleasure to offer you, on behalf of the British Railway Companies, the most cordial welcome to this great Congress with which His Royal Highness the Duke of York has very graciously associated himself by honouring us with his presence here to-day, of which honour we are all the more sensible in view of the calls upon His Royal Highness's time and the many engagements to which he is committed.

« It will not be the first occasion upon which some of you, Gentlemen, have visited this country, either as delegates or in your private capacities. To those, let me say that we trust that this visit will be a happy renewal of old associations.

« To those who are paying their first visit to our country, may I express the hope that their experiences may lead them to make further excursions to our shores, so as to enable them to explore in more leisurely manner than the present occasion affords them, our scenery, our institutions, and last, but by no means least, our railways.

« As I understand I shall probably have to address you again later, I will now only add that the railwaymen of Great Britain are sincerely glad to extend the hand of welcome to their colleagues who are so intimately associated with the running of railways throughout the world. » (*Prolonged applause.*)

The Duke of York then withdrew, and was saluted by prolonged applause from the assembly.

Mr. Foulon then took the chair and addressed the delegates as follows :

« Gentlemen,

« Colonel Ashley, Minister of Transport, on behalf of the British Government, and the Right Hon. Viscount Churchill, on behalf of the British Railway Companies, have welcomed the delegates to the Congress in the most cordial terms. In the name of this assembly I wish to tender them our sincere thanks. (*Applause.*)

« On behalf of the Permanent Commission, I have the honour to propose that Colonel Ashley, who is taking the keenest interest in the Congress, be elected Honorary Vice-President of the tenth session. (*Hear, hear.*)

« The time has now come, Gentlemen, for us to appoint an acting President for the present session, an office which, ac-

cording to precedent, is offered to a distinguished representative of the country in which the session is held.

« The Right Hon. Viscount Churchill, Chairman of the Great Western Railway, who holds so eminent a position, and is so great an authority in the railway world, has appeared to the Permanent Commission as peculiarly indicated for this important position. » (*Applause.*)

« I propose, Gentlemen, to nominate as president of the tenth session, The Right Hon. Viscount Churchill, and as acting vice-presidents, Mr. Gustav Berens and The Right Hon. Sir Evelyn Cecil. » (*Renewed applause.*)

Viscount Churchill then took the chair as President, and declared that the principal delegates of each adherent government were appointed vice-presidents of the Association.

Viscount Churchill then addressed the Congress as follows :

« My Lords and Gentlemen,

« In taking the chair to which you have done me the honour of electing me, my first duty is to proceed with the election of the General Secretaries for the present Session of the Congress.

« I am quite sure that we could not have better Secretaries than Mr. Ghilain, General Secretary of the Permanent Commission, and Sir Henry Fowler, deputy chief mechanical engineer of the London Midland & Scottish Railway, and I have pleasure in submitting their names for your approval.

« I am certain that no one will oppose this proposal, and therefore I declare that these Gentlemen are unanimously elected. (*Applause.*)

« Now, Gentlemen, we will proceed with the proper business of the Congress.

« You will have noticed from the agenda that the subjects for discussion cover a very wide area — I think I may almost describe them as covering effectually the entire scope of railway organisation and equipment — and thus we have the opportunity of enjoying a very busy Session.

« You will find that the efforts of our Local Organisation Committee, who for a long time past have been working to make this meeting an outstanding success, have provided for your carrying out the discussions in comfort and with ease. I also hope that the excursions which have been arranged will allow you to see some of the characteristic scenery of this country, and also to obtain an insight into the methods and organisation of our railroads at first hand. You may rest assured that until the last of the delegates has returned home, we shall not relax our efforts to make this Session both instructive and interesting.

« It is appropriate, perhaps, that I should say a word or two with regard to the site on which we are meeting, and on the buildings in which the various sections will meet for discussion.

« The building in which we are meeting to-day — the Institution of Civil Engineers — and the neighbouring building, the headquarters of the Mechanical Engineers — in which some of our meetings are to be held — have particular associations with the railway industry. The last-named Institution was founded some 70 years ago by the man whom we look upon as the father of the railways, viz. : George Stephenson. It is peculiarly appropriate that the Institution's President for this year should be an eminent locomotive engineer, in the person of Sir Vincent Raven — whose work will be well known to you all.

« It is indeed fitting that we should be holding the meetings of the Tenth Congress in such surroundings and under such auspices, particularly when we remember that the present year is the centenary of the birth of the railway movement.

« I do not wish to burden you by quoting figures to show the extent to which railways throughout the world have grown since the opening, in the year 1825, of those 30 miles of line between Stockton and Darlington. I would rather ask you to compare the conditions of things in general — and transport conditions in particular — a hundred years ago with those which exist to-day. Never in history has there been such a change in so short a period. The advent and development of the railway has made possible the closer intercourse of all mankind; it has opened the markets of the world to the industrial nations and at the same time has enlarged the area from which those nations draw their supplies and increased the varieties of materials available to them; it has, in fact, revolutionised the whole of our lives. Except in a very hazy sort of way, it is difficult to realise the state of affairs prior to the introduction of the iron road with which we here to-day are all so closely associated, and the development of which we trust is for universal good.

« We are delighted to think that we shall have an opportunity of joining in the Centenary Celebrations to commemorate the opening of the first passenger railway service in the world, which will be taking place at Darlington during your visit, and that we shall also be enabled to see for ourselves, on historic ground, examples of the progress which has been made in railway rolling stock during the past century. We shall, too, have an opportunity in visiting the various railway centres, of appreciating to the full the tremendous march of progress which these 100 years of railway work has made possible even in this country.

« It would be unnatural if our thoughts did not turn at this time to the previous session of the Congress held in London 30 years ago. Many have been the changes since that time, but it is interesting to note that now, as then, the programme to be discussed is of a very catholic nature, and clearly shows that the activities of the Association cover a very broad sphere.

« In looking through the records of the previous meeting, I have been very interested to note that at that time, as to-day, the Treasurer of the Association was Mr. Edward Holemans, whom we are delighted to see with us. Mr. Holemans has occupied the same position since the inception of the Association in 1885, and I am sure you will join with me in offering the Association our congratulations on the wonderful service he has rendered and is rendering, and in offering him our congratulations on his health and vigour in spite of the privations and personal sacrifices he made during the Great War. » (*Applause.*)

« I also noted that one of the delegates to the Meeting of 1895 — who was then elected a member of the Permanent Commission — was Mr. Gustav Behrens. We all here realise and appreciate, as we know our Brussels colleagues do, the sterling work which has been done by him for the Association, which has had such satisfactory results in the intercourse of railwaymen throughout the world. (*Renewed applause.*)

« Mr. Foulon has mentioned that since the last meeting the Association has sustained a severe loss in the untimely death

of Mr. Verdeyen, and I am sure you would wish that we should express our sympathy to M^me^ Verdeyen and her family at their loss, which is also felt by all interested in the Association and in railways generally.

« We have also to regret the retirement of our ex-President, Mr. Tondelier, who has very wisely shaken off the burdens of office while there is yet time. To him we offer our sincerest good wishes and every happiness in his well-earned retirement, which we trust he will be spared to enjoy for many years. (*Applause.*)

« Now, Gentlemen, I must just say a word or two as to the work of the present Congress, which, as you are aware, commences at 9.30 to-morrow (Tuesday) morning.

« The first business of the delegates will be to assemble in the various sections in which they are interested, to appoint their sectional officers, in order that the work may be carried out in a business-like manner, and when these formalities have been completed the delegates will proceed to discuss the subjects enumerated on the agenda, with copies of which you have been supplied.

« Commencing on Wednesday next, after the business of the morning meetings is completed, you will be free to enjoy during the afternoons the very comprehensive and attractive programme of excursions which has been arranged — and of which I trust you will take advantage, and thoroughly enjoy.

« Before we disperse, I have the honour to announce that Mr. Foulon, as President of the Permanent Commission, will proceed, on behalf of the Congress, to lay a wreath on the Cenotaph in Whitehall, in honour of the men of Great Britain who fell in the Great War.

« In view of the density of the traffic, the Police find it impossible to arrange for an organised deputation to accompany Mr. Foulon. He will therefore be accompanied by five representatives of the Congress — Messrs. Colson, d'Alessio, Ghilain, Sir Evelyn Cecil and myself.

« You, Gentlemen, may, however, proceed as you wish to Whitehall, but it is desired that you will kindly remain on the foot-way during the ceremony, as the exigencies of the road traffic will not permit of a large number of delegates to stand in the carriage-way. »

The meeting broke up at 4.30 p. m. amidst general enthusiasm.

In accordance with the proposal of Viscount Churchill, the delegates proceeded to Whitehall, where a wreath bearing the Belgian colours — the Association having its headquarters in Brussels — was placed at the foot of the Cenotaph. A number of members accompanied the Delegation.

GENERAL OFFICERS OF THE SESSION

Honorary president :

H. R. H. The Prince of Wales.

Honorary vice-president :

The Right Hon. Lieut.-Col. Wilfred Ashley, M. P., Minister of Transport, Great Britain.

Acting president :

The Right Hon. Viscount Churchill, G. C. V. O., chairman of the Great Western Railway, Great Britain (member of the Permanent Commission).

Vice-presidents :

Gustav Behrens, director of the London Midland & Scottish Railway (member of the Permanent Commission) ;

The Right Hon. Sir Evelyn Cecil, G. B. E., M. P., privy councillor, director of the Southern Railway, Great Britain (member of the Permanent Commission).

Statutory vice-presidents [1] :

Belgium. — E. Foulon, administrateur-directeur général des Chemins de fer de l'Etat (president of the Permanent Commission).

Brazil. — Dr. Aarâo Reis, ingénieur, professeur à l'Université de Rio-de-Janeiro.

Chili. — M. Salinas, chargé d'affaires du Chili à Londres.

China. — Dr C. C. Wang, C.E., Ph. D., conseiller supérieur du Ministère des communications, ex-président des Chemins de fer de l'Est chinois, directeur général des Chemins de fer du gouvernement chinois.

Czecho-Slovakia. — E. Kabes, ingénieur, chef de section au Ministère des chemins de fer.

Denmark. — T. Andersen Alstrup, directeur général des Chemins de fer de l'Etat (member of the Permanent Commission).

Egypt. — Abdul Hamid Pacha Soliman, directeur général des Chemins de fer de l'Etat (member of the Permanent Commission).

Finland. — O. Donner, ministre de Finlande en Grande-Bretagne.

France. — C. Colson, membre de l'Institut, vice-président du Conseil d'Etat de France, inspecteur général des ponts et chaussées (vice-president of the Permanent Commission).

Great-Britain. — The Right Hon. Lieut.-Col. Wilfred Ashley, M. P., Minister of Transport.

Greece. — K. Pantazis, directeur des chemins de fer au Ministère des communications.

Holland. — L. M. Barnet Lyon, ingénieur civil, ex-membre du Conseil de surveillance des chemins de fer néerlandais (member of the Permanent Commission).

India. — Sir Ernest Albert Seymour Bell, Kt., C. I. E., Government Director of the Indian Railway Companies (member of the Permanent Commission).

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[1] Article 13 of the rules and regulations of the Association.

Irish Free State. — J. INGRAM, director, Transport and Marine Branch, Department of Industry and Commerce.

Italy. — F. d'ALESSIO, avocat, député au Parlement, professeur ordinaire de droit administratif à l'Université royale de Pavie.

Japan. — T. ITO, chief engineer, bureau of private railway administration.

Mexico. — A. PANI, consul général du Mexique à Paris.

New South Wales. — J. DAVIS, M. Inst. C. E., consulting engineer in London for the New South Wales Government.

New Zealand. — J. MASON, member of the New Zealand Railway Board.

Norway. — E. HEIBERG, directeur général des Chemins de fer de l'Etat.

Poland. — J. EBERHARDT, ingénieur, sous-secrétaire d'Etat.

Portugal. — A. de SOUSA REGO, ingénieur, directeur général des Chemins de fer.

Rumania. — S. PRETORIAN, directeur général des Chemins de fer de l'Etat.

Servian, Croatians and Slovenish (Kingdom of). — B. DJOURITCHITCH, directeur-adjoint des Chemins de fer de l'Etat.

Siam. — C. P. SANDBERG, M. Inst. C. E., consulting and inspecting engineer, Ministry of Communications.

Spain. — José FUSTER Y TOMAS, ingénieur en chef de 1re classe des ponts et chaussées, chef des études de construction des Chemins de fer du Nord-Est de l'Espagne.

Sweden. — A. GRANHOLM, directeur général des Chemins de fer de l'Etat (member of the Permanent Commission).

Switzerland. — Le Dr R. HEROLD, chef de la division des chemins de fer au département fédéral des chemins de fer (member of the Permanent Commission).

Tunis. — FAVIÈRE, ingénieur en chef des ponts et chaussées, directeur général adjoint des travaux publics, directeur du contrôle des chemins de fer.

United States of America. — Colonel E. A. SIMMONS, U. S. Army, O. R. C.

Uruguay. — STORM, ingénieur.

General secretaries :

Sir Henry FOWLER, K. B. E., deputy chief mechanical engineer, London Midland & Scottish Railway (member of the Permanent Commission).

P. GHILAIN, ingénieur en chef, inspecteur de direction aux Chemins de fer de l'Etat belge, président de la Commission de réception du matériel et des approvisionnements (general secretary of the Permanent Commission).

OFFICERS OF SECTIONS

SECTION I. — Way and Works.

President : E. F. C. TRENCH, chief engineer, London Midland & Scottish Railway.

Vice-presidents : G. A. HARWOOD, vice-president in charge construction and development, New York Central Railroad.

J. HAUER, ingénieur, conseiller ministériel, Chemins de fer de l'Etat tchécoslovaque.

A. LINES, F. C. H., superintending engineer (officiating chief engineer), North Western Railway (India).

Principal secretary : R. DESPRETS, ingénieur principal aux Chemins de fer de l'Etat belge (assistant secretary of the Permanent Commission).

Secretaries :

L. DEPOORTER, ingénieur en chef, directeur de service aux Chemins de fer de l'Etat belge.

T. H. RICHARDSON, engineering department, London Midland & Scottish Railway.

Leslie W. R. ROBERTSON.

SECTION II. — Locomotives and rolling stock.

President : M. WEISS, ingénieur en chef de la traction à la direction générale des Chemins de fer fédéraux suisses.

Vice-presidents : A. FABRIS, ingénieur, chef du service du matériel et de la traction des Chemins de fer de l'Etat italien (member of the Permanent Commission).

H. N. GRESLEY, C. B. E., chief mechanical engineer, London & North Eastern Railway.

Dr R. HEROLD, chef de la division des chemins de fer au Département fédéral suisse des chemins de fer (member of the Permanent Commission).

M. LACOIN, ingénieur en chef du matériel et de la traction à la Compagnie du chemin de fer de Paris à Orléans.

Principal secretary : E. MINSART, ingénieur principal aux Chemins de fer de l'Etat belge (assistant secretary of the Permanent Commission).

Secretaries :

O. BULLEID, London & North Eastern Railway.

F. CÉRÈS, représentant de la Compagnie du chemin de fer de Paris à Orléans, à Cardiff.

H. CHAMBERS, C. M. E. Dept., London Midland & Scottish Railway.

SECTION III. — **Working.**

President : E. DU CASTEL, ingénieur en chef des ponts et chaussées, directeur général honoraire des chemins de fer au Ministère des travaux publics de France (member of the Permanent Commission).

Vice-presidents : H. BREAUD, directeur général des Chemins de fer de l'Etat français.

M. F. KEOGH, general manager, Great Southern Railways (Ireland).

J. MILNE, C. S. I., assistant general manager, Great Western Railway (Great Britain).

J. W. ROBERTS, general superintendent transportation, Eastern region, Pennsylvania Railroad System (U. S. A.).

Principal secretary : J. VAN RIJN, ingénieur principal aux Chemins de fer de l'Etat belge (assistant secretary of the Permanent Commission).

Secretaries :

J. CHEVALIER, contrôleur de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans.

H. C. KING STEPHENS, Southern Railway (Great Britain).

E. LIVESEY, Southern Railway (Great Britain).

SECTION IV. — **General.**

President : Dr J. H. PARMELEE, director of the Bureau of railway economics, American Railway Association.

Vice-presidents : J. EBERHARDT, ingénieur, sous-secrétaire d'Etat, Chemins de fer de l'Etat polonais.

Sir Herbert A. WALKER, K. C. B., general manager, Southern Railway (Great Britain).

Dr C. C. WANG, C. E., Ph. D., conseiller supérieur du Ministère des communications de Chine, ex-président des Chemins de fer de l'Est chinois, directeur général des Chemins de fer du gouvernement chinois.

Principal secretary : L. SANTINI, ingénieur du service des approvisionnements de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée.

Secretaries :

T. H. C. ALLEN, chief goods manager's department, London Midland & Scottish Railway.

Dr R. COTTIER, secrétaire général des Chemins de fer fédéraux suisses.

F. ENGEL, London Midland & Scottish Railway.

W. H. HARPER, London Midland & Scottish Railway.

SECTION V. — **Light railways and colonial railways.**

President : Guido SEMENZA, ingénieur, Ministère des travaux publics (Italy).

Vice-presidents : T. Bals, directeur des Chemins de fer de l'Etat roumain.

Caufriez, directeur général de la Société nationale belge des chemins de fer vicinaux (member of the Permanent Commission).

F. Pick, assistant managing director, Underground Electric Railways Company of London.

F. P. Teixeira, administrateur général, Chemins de fer de l'Etat portugais.

Principal secretary : E. Belpaire, ingénieur en chef, directeur à la Société nationale belge des chemins de fer vicinaux.

Secretaries :

L. H. K. Neil, London & North Eastern Railway.

A. Newbold, Southern Railway (Great Britain).

E. Vanni, ingénieur, inspecteur principal à la direction générale des Chemins de fer de l'Etat italien.

General interpreters : C. E. Roche and Dr A. Velleman.

PROGRAMME OF THE SECTIONAL MEETINGS

—		SECTION I. — WAY AND WORKS.	SECTION II. — LOCOMOTIVES AND ROLLING STOCK
Tuesday 23 June . .	*Morning* . .	Installation of the section and fixing the programme of procedure. —	Installation of the section and fixing the programme of procedure. —
	Ditto. . . .	III. Shunting yards. *With section III.*	IV-A. Reduction of the cost of tractio fuel and its combustion.
	Afternoon . .	...	Ditto. (*Continued.*) IV-B. Reduction of the cost of tractio lubrication of axleboxes for rolling stock.
Wednesday 24 June .	*Morning* . .	III. Shunting yards. (*Concluded.*) *With section III.*	IV-A. Reduction of the cost of tractio fuel and its combustion.
	Afternoon . .	...	IV-B. Reduction of the cost of tractio lubrication of axleboxes for rolling stock. ...
Thursday 25 June. .	*Morning* . .	I-A. Maintenance of the track	IX. Fixed signals. *With section III.*
	Afternoon . .	I-B. Level crossings (public ro ...	...
Friday 26 June. . .	*Morning* . .	II Breaking of rails. Joints.	V. Electric locomotives.
	Afternoon . .	...	IV-B. Reduction of the cost of tractio lubrication of axleboxes for rolling stock. (*Concluded.*) V. Electric locomotives. (*Continue*
Saturday 27 June. .	*Morning* . .	General meeting.	General meeting.
	Afternoon . .	...	...
Monday 29 June . .	*Morning* . .	II. Breaking of rails. Joints. (*Concluded.*)	V. Electric locomotives. (*Conclude*
	Afternoon . .	...	...
Tuesday 30 June . .	*Morning* . .	VI. Locomotive sheds. *With sectio II.*	VI. Locomotive sheds. *With section I.*
	Afternoon . .	...	...
Wednesday 1 July .	*Morning* . .	VI. Locomotive sheds. (*Concluded*). *With section II*	VI Locomotive sheds. (*Concluded.*) *With section I.*
	Afternoon . .	General meeting and closing ceremony.	General meeting and closing ceremony

SECTION III. — WORKING.	SECTION IV. — GENERAL.	SECTION V. — LIGHT RAILWAYS AND COLONIAL RAILWAYS.
tallation of the section and fixing the programme of procedure. — Shunting yards. *With section I.* ..	Installation of the section and fixing the programme of procedure. — X. The eight-hour day. Ditto (*Continued*)	Installation of the section and fixing the programme of procedure. — XIII. Establishment of light railways. Ditto. (*Continued.*)
Shunting yards. (*Concluded.*) *With section I.* ...	X. The eight-hour day. (*Continued.*) ...	XIII. Establishment of light railways. (*Continued.*) ...
Fixed signals. *With section II.* ...	X. The eight-hour day. (*Concluded.*) XI. Statistics. ...	XIII. Establishment of light railways. (*Concluded.*) XIV. Concessions for light railways. ...
Joint stations and lines. *With section IV.* ...	XII. Joint stations and lines. *With section III.* ...	XV. Traction for light railways. Ditto. (*Concluded.*)
General meeting. ...	General meeting. ...	General meeting. ...
Suburban services. ...	... ...	... ...
Dispatching system. ...	... ...	... ..
Dispatching system. (*Concluded.*) ral meeting and closing ceremony.	... General meeting and closing ceremony.	... General meeting and closing ceremony.

SUMMARY REPORT OF THE DISCUSSIONS

IN THE SECTIONS

SECTION I.

Way and Works.

President : E. F. C. Trench.

Vice-presidents : G. A. Harwood, J. Hauer and A. Lines.

Principal secretary : R. Despretz.

QUESTION I-A.

Maintenance of the track.

Different methods of maintenance and repair of the track. (By the administration, by contractors, by piece work or premium system. Mechanical appliances, etc.) Comparison from the technical and economical points of view.

Preliminary documents.

1st report (France), by Mr. R. Ruffieux. (See English edition of the *Bulletin*, March 1925, p. 699, or separate issue [with red cover] No. 26.)

2nd report (America), by Mr. G. J. Ray. (See English edition of the *Bulletin*, January 1925, p. 1, or separate issue [with red cover] No. 10.)

3rd report (all countries, except France, America and the British Empire), by Mr. H. Deyl. (See English edition of the *Bulletin*, May 1925 [2nd part], p. 1663, or separate issue [with red cover] No. 42.)

4th report (British Empire), by Mr. W. H. Coomber. (See English edition of the *Bulletin*, March 1925, p. 675, or separate issue [with red cover] No. 25.)

Special reporter : Mr. R. Ruffieux. (See English edition of the *Bulletin*, June 1925, p. 2055.)

Report of the 1st section.

(See *Daily Journal of the session*, No. 4, p. 3.)

In opening the meeting, the president, Mr. Trench, remarked on the interest of the questions down for discussion and asked the delegates to be as concise as possible in view of the extent of the subject. He requested them to confine themselves to matters which had become important since the Rome Congress; mechanical appliances for permanent way maintenance, re-organisation of gangs in order to economise labour. He mentioned as a new feature the standardisation of permanent way material in England and the recent introduction in Ireland of a method for mechanically laying the

track. It would be interesting if any of the delegates could give any information as regards the latter.

He then called upon Mr. RUFFIEUX, special reporter, who read his summary of the reports dealing with permanent way maintenance. This special report had been based on the reports prepared by Messrs. COOMBER, RAY, RUFFIEUX and DEYL.

Mr. DEYL (*reporter*) then read an additional note drawing special attention to the « Taylorisation » and re-organisation of maintenance gangs, questions already dealt with in his report.

A discussion then took place on the various points in the summary. It was opened by an observation by Mr. ELLSON (*Southern Railway, Great Britain*) on the subject of the wear of rails and the relative effect of their chemical compositions — hard steel, special steel, sorbitic steel — to decrease the wear, taking into account the increase in the cost of the steel.

THE PRESIDENT pointed out that this matter was more concerned with the question of the breakage of rails.

He proposed to adopt clause 1, mention being made of the drainage of the formation.

— Adopted.

He also proposed the adoption of clause 2 : « The standardisation of material is advantageous from a technical and economic point of view. »

Mr. STOÏKA (*Roumanian State Railways*) considered that this clause should indicate the basis on which standardisation had been carried out, especially as affected by the axle loads. As regards freight stock, the weight of petroleum wagons in Roumania was as much as 30 to 40 tons, and 50 ton wagons were running on other companies' roads. It would be well therefore to state a maximum axle load — for example 20 tons — in standardising the track, at any rate for lines carrying international traffic. This suggestion was opposed by the PRESIDENT and by Mr. JULLIEN (*Paris-Orleans Railway*) and Mr. QUINQUET (*Paris-Lyons-Mediterranean Railway*) as not coming within the scope of the question.

— Clause 2 was therefore adopted.

Clause 3 : « It is desirable, in order that more time may be spent on maintenance work, to reduce the time spent in systematic daily inspections... »

While agreeing with the principle expressed in this clause, a discussion arose over the words « systematic daily ».

Mr. TETTELIN (*Northern Railway, France*) asked that the word « daily » might be deleted, as the practice of his company, which gave good results, was to make weekly inspections.

THE PRESIDENT feared, however, that this alteration of the text might imply to the English and American delegates view that these inspections were useless.

Mr. JULLIEN proposed to meet the difficulty by replacing the word under discussion by « periodical ». The text as thus amended was adopted.

— Clause 4 was adopted subject to the deletion of the word « exactly ».

Clause 5 dealing with the method of upkeep gave rise to a pertinent observation by Mr. TETTELIN that the amount of upkeep of the track increased with its age. During the first part of its life it appeared to be obviously practically nil. He

asked the President what was the renewal period of the British lines, whose excellence he had noticed.

THE PRESIDENT, in agreement with his British colleagues, informed Mr. Tettelin that it was 20 years for main lines and 30 years for secondary lines.

— Clause 5 was then adopted.

— Clause 6 was also adopted after some remarks by Mr. FERREIRA (*Portuguese Railway Company*) who considered it desirable to mention the more suitable mechanical appliances for permanent way maintenance work.

A discussion then took place over clause 7 : « It is essential for economic reasons to prolong as far as possible the life of the permanent way materials... »

Mr. TETTELIN drew special attention to the importance of the ballast as regards maintenance. It is essential to keep the ballast clean and free from grass. Cleaning of ballast is a costly operation and one which does not lead to a consolidation of the track. It is therefore done as rarely as possible.

Mr. Tettelin also mentioned that the British had fully appreciated the importance of this fact and that there is no grass whatever on their lines.

Mr. Tettelin was strongly of the opinion that the word « grass » should appear in the heading of the clause. However, after the intervention of the PRESIDENT, it was agreed that the wording of clause 7 should be to keep the ballast perfectly clean and free from all vegetation so as to prolong as far as possible the life...

— After a short discussion, clause 8 dealing with mechanical appliances was also adopted.

Clause 9 dealing with the use of motor trolleys also gave rise to an exchange of opinions between the various delegates.

Mr. COOMBER (*reporter*) considered on the one hand that it is difficult to allow these to be used on lines carrying heavy traffic.

Mr. JULLIEN, speaking from the experience gained on his system, was of the opinion that it is possible to obtain good results provided strict attention is paid to the needs of the traffic department. The motor trolleys were no doubt economical and advantageous for transporting material.

Mr. RAY (*reporter*) mentioned that motor trolleys are very widely used and gave excellent results in America. It is necessary, however, that they should be in charge of experienced men. Motor trolleys were not protected by the ordinary signalling system, but special methods are adopted.

In support of this view, Mr. QUINQUET stated that on his system motor trolleys were used under the same conditions, certain precautions being used, and their use was avoided during the hours of the day when traffic was most dense.

— Clause 9 was then adopted, with the addition : « especially for material ».

Clause 10 : « The grouping of the maintenance personnel into gangs » was adopted with the modification — has in a number of cases given satisfactory results — as the result of information given by Mr. COOMBER on the unsatisfactory results of this system in South America.

Clause 11 gave rise to some new observations showing the difference of the

French and British points of view as regards carrying out maintenance work by contract or by a permanent personnel of the railway, the British view being against maintenance by contract.

— Clause 11 was, however, adopted after a slight modification of the text.

A short discussion took place on clause 12 dealing with inspectors' rounds between Mr. COOMBER, the PRESIDENT and Mr. QUINQUET, all of these agreeing that rounds on foot are the most effective. The need for rounds of inspection on foot is mentioned in clause 12, which was adopted with this addition.

Clause 13 dealing with the rational organisation and « Taylorisation » of maintenance work was adopted without discussion.

Clause 14 dealing with mechanical appliances gave rise to a further suggestion of Mr. FERREIRA on this point.

He proposed, with the approval of all the delegates, that the question of mechanical appliances and the scientific organisation of maintenance gangs should be placed on the agenda for the next Congress.

Mr. MILES (*London Midland & Scottish Railway, Great Britain*) at the request of the PRESIDENT, then gave a short description of a track laying apparatus used in Ireland for laying complete sections of track. This process was developed by Mr. BRETLAND (*Great Southern Railway, Ireland*) and is used to lay Vignoles type rails, the gauge being 5 ft. 3 in. In order to obtain satisfactory results, it is necessary to interrupt the train service for 3 or 4 hours during the night. The output under these conditions is 600 yards in 4 hours, representing an economy of 50 % over the old methods.

(A complete description will appear in the full report.)

THE PRESIDENT thanked Mr. Miles for his interesting description.

The Section decided to lay the following text before the General Meeting :

Final summary.

« 1. — The proper construction and « drainage of the formation and superstructure is a *sine qua non* of efficient « maintenance work.

« 2. — The standardisation of material « is desirable for both technical and economic reasons.

« 3. — It is desirable to reduce as far « as possible the time spent in periodical « rounds of inspection.

« 4. — It is desirable, either on the « knowledge gained by past experience, « or by adopting some method of suitably « distributing the various elements of « maintenance work, to determine the « proportion which should exist between « labour employed and work done.

« 5. — Although the system of carrying « out local maintenance work where « found necessary is adopted on many « railways, the majority of the reporters « consider that the system of a periodical « general overhauling is the safer and « more economical. The two systems are « perhaps not so different from one another as might be supposed, both being « based on the same principles, although « in one case these principles are applied « according to the necessities of the moment, while in the other they receive a « more systematic application. In any

« case, both systems give excellent results « in the hands of companies who know « how to work them.

« 6. — The technical processes adopted in the different branches of maintenance work are not uniform. It would be useful if systematic experimental work could be undertaken with a view to determining the best methods of work applicable to each operation, taking into account the advantages to be derived from the use of mechanical appliances.

« 7. — It is essential for economic reasons to keep the ballast clean and free from vegetation; also to prolong as far as possible the life of the permanent-way materials; in particular, sleepers should not be scrapped before reaching their limit of wear.

« 8. — The obstacles encountered in Europe as regards the development of mechanical processes in routine maintenance work are generally of an economic nature : high cost of the mechanical equipment, inadequate daily output of the equipment resulting from the difficulty of co-ordinating mechanical work and manual labour on a given piece of work. These obstacles, however, are not met with in America, where considerable economies are effected by the use of not only small appliances such as tamping machines, but also of much more powerful machines, such as machines for screening ballast, levelling the track, etc.

« 9. — Motor trolleys (provided due regard is paid to the regulations relating to the safety of running on the line) constitute an economic means of transporting men and particularly for materials.

« 10. — The grouping of maintenance personnel into gangs for work on long stretches of line, and the provision of rapid means of transporting the gangs (trains or trolleys), has in a number of cases given satisfactory results.

« 11. — The ordinary routine forms of maintenance work do not lend themselves to the contract system, and should be carried out by the permanent personnel of the railway, augmented where necessary by temporary employees.

« For the more important work, the same system is still to be preferred, but (and indeed in certain countries it has been found advantageous) either on account of economic reasons or because of the scarcity of labour to have the work performed by contract, provided that contracts are placed on the result of competitive tendering.

« 12. — As the Inspectors' rounds are essential for the efficient control of maintenance work, their frequency should be facilitated by the provision of adequate means of rapid transport, in addition to the rounds on foot, which are of the greatest importance.

« Recording apparatus of the Hallade type constitutes a valuable auxiliary means of controlling maintenance work.

« 13. — The analysis of the various operations comprised in maintenance work, and the rational application of such analysis to the organisation of the work, is a problem which calls for considerable further study. This question is intimately connected with the further question of the control of output, of bonuses, and of piece work. It does not appear that the investigations so far carried out in this direction have resulted in any general solution of the problem.

« 14. — The use of powerful mechanical appliances, such as those in use in certain parts of the British Empire and in America, may be expected to transform the technical aspect of the problem of renewals of the superstructure of the permanent way.

« As regards the older processes, in which mechanical appliances play but a small part, it is desirable to determine by systematic research which are the best methods from the economic and technical points of view.

« This class of work has been carried out either by the railways themselves or by contract, with satisfactory results; choice between the two systems is determined by the circumstances of each particular case, or by the conditions peculiar to the individual railway. »

— The General Meeting ratified this final summary at the meeting held on 27 June.

QUESTION I-B.

Level crossings (public roads).

Dispensing with crossing keepers. Visibility of the trains from the crossing : warning notices and signals, etc.

Preliminary documents.

1st report (all countries, except the British Empire, America, France, Italy, Spain and Portugal), by Mr. Maas-Geesteranus. (See English edition of the *Bulletin*, February 1925, p. 203, or separate issue [with red cover] No. 16.)

2nd report (France), by Mr. R. Ruffieux. (See English edition of the *Bulletin*, March 1925, p. 761, or separate issue [with red cover] No. 27.)

3rd report (America), by Mr. G. J. Ray. (See English edition of the *Bulletin*, January 1925, p. 13, or separate issue [with red cover] No. 11.)

4th report (Italy, Spain and Portugal), by Mr. Mendizabal. (See English edition of the *Bulletin*, May 1925 [2nd part], p. 1621, or separate issue [with red cover] No. 41.)

Special reporter : Mr. R. Ruffieux. (See English edition of the *Bulletin*, June 1925, p. 2073.)

Report of the 1st section.

(See *Daily Journal of the session*, No. 4, p. 4.)

The President then dealt with the 2nd question on the agenda, and called upon Mr. Ruffieux, *special reporter*, to read a summary of his report dealing with the question of the abolition of gate-keepers at level crossings.

Mr. Maas-Geesteranus (*reporter*) expressed regret on behalf of the Japanese railways that it had been impossible for them to contribute to his report owing to the recent earthquakes; he gave a brief report just received from Japan which will be printed in full in a later edition of the *Bulletin of the International Railway Congress*.

The President proposed to proceed with the discussion of the final summary. He pointed out that this subject is of less importance in England than in other countries, as in the United Kingdom level crossings are rare. Moreover, from a legal standpoint, it would be difficult to abolish gate-keepers at level crossings which are now guarded.

An interchange of opinion took place on clause 1 between various delegates as regards : Visibility and traffic at a level crossing.

Mr. QUINQUET (*Paris-Lyons-Mediterranean Railway*) proposed to modify the end of the clause as follows : « except on railways carrying heavy traffic ».

Mr. RUFFIEUX pointed out that the American report went to show that safety is ensured provided that visibility is sufficient.

Mr. RAY (*reporter*) stated that in the United States the determining factor is the traffic on the road. If the latter is heavy, it is necessary to provide a gate-keeper at the level crossing. Road users as a rule pay very little attention to traffic on the railway, this being especially so in the case of motor drivers, whatever the visibility.

As regards the engine driver, he can only carry out his instructions, but as a rule sees the obstacle too late to avoid an accident.

Mr. WASIUTYNSKI (*Polish State Railways*) thought, however, that visibility from the engine driver's point of view is also an important matter.

The delegates finally came to an agreement that gate-keepers might be abolished at level crossings when trains are sufficiently visible from all directions, except in the case of roads carrying very heavy traffic.

— Clause 2 was adopted after a short discussion between Mr. DEYL (*Czecho-Slovakian State Railways*), Mr. RUFFIEUX and Mr. MAISON (*French Government*).

— Also clauses, 3, 4, 5, 6, 7 and 8.

A discussion took place as regards the 2nd paragraph of clause 9 proposing the prohibition of the use of red lights in the steers ans as tail lights of motor vehicles.

Mr. TETTELIN (*Northern Railway, France*) pointed out that it was rather the business of the railway administrations not to use red lights to indicate the approach of a level crossing. Moreover, the railways had no power to make rules to be observed by motor vehicles.

Mr. RUFFIEUX replied that this paragraph had been put forward by Mr. Ray.

Mr. RAY stated that in America it was now proposed to prohibit red tail lights on motor vehicles. These lights had various disadvantages. A driver seeing the red light on a crossing gate concluded that he was following another vehicle and ran into the gates.

In the case of roads running alongside the railway, locomotive drivers were also led into making mistakes by the red tail light of a motor vehicle, and this is confusing and disturbing, for as we know, respect of a red light is second nature to an engine driver.

Mr. DEYL stated that the International Railway Union were considering international rules as regards approaches to level crossings, and it would be as well to abstain from interfering with their investigations.

Finally the meeting agreed unanimously on the proposal of Mr. RUFFIEUX to delete the second paragraph of clause 9.

The other clauses were adopted without any important discussion.

The text of the final summary as adopted is as follows :

Final summary.

« 1. — The abolition of gate-keepers « gives important economical advantages, « and causes no inconvenience to level « crossings, except where traffic is excep-

« tionally heavy and where the field of « view of approaching trains from the « road is sufficient in all directions;

« 2. — The approach to level crossings, « the supervision of which has been « abolished, should be notified to users « of the road by signals that are visible « day and night where necessary, and « which allow drivers of the fastest run- « ning vehicles likely to use the crossings « to stop before reaching them. In cases « where the field of view is insufficient, « these signals should themselves be pre- « ceded by advanced signals placed at « suitable distances from them. It is ad- « visable that these signals should in- « dicate the number of tracks that have « to be crossed.

« The international signal announcing « the approach to a level crossing is not « suitable for unattended crossings;

« 3. — Even in those cases where the « visibility of trains as seen from the « road is insufficient, abolition of gate- « keeping may take place without incon- « venience, on condition that automatic « apparatus announcing the approach of « trains is placed near the crossings;

« 4. — Level crossings at which gate- « keeping is dispensed with during part « of the day should be provided with « special warning apparatus similar to « that used on unattended crossings, but « hidden from the public view during the « period the crossings are under super- « vision;

« 5. — A good automatic warning signal « working at all hours of the day and « night offers a much greater guarantee « of safety at nearly all level crossings « than the protection given by gate- « keepers or attendants during a part of « the day only;

« 6. — Automatic apparatus announc- « ing the approach of trains having two « scintillating lights, or oscillating signals « that can be depended upon, are among « the best forms of automatic signals;

« 7. — Automatic signals that announce « the approach of trains should, if the « apparatus fails or gets out of order, « show to road vehicles a danger signal « visible both day and night.

« It is desirable that they should not « be influenced in the vicinity of stations « by operations which do not concern the « crossings;

« 8. — Audible warning signals are not « as serviceable as luminous signals, and « are only justified at isolated crossings « of small importance;

« 9. — It is desirable that signals « announcing level crossings and trains « should be of standard and international « type, so that their indications may be « understood and observed by all;

« 10. — The Congress might adopt a « motion inviting countries, the Railway « Administrations of which are members « of the International Association, to « issue a recommendation that with rare « exceptions gate-keepers, at level cross- « ings where local conditions permit, « should be dispensed with;

« 11. — The cost of fixing and main- « tenance of announcing apparatus at « level crossings where supervision has « been dispensed with, could be distri- « buted between the railway administra- « tions and the authorities interested in « traffic on the roadways;

« 12. — With the reservations mention- « ed above, opinion should be influenced « so that the public may see to its own « safety when negociating level cross- « ings (1). »

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(1) Insert here in the final text clause 13 given hereafter in the discussion at the General Meeting.

Discussion at the General Meeting.

— This final summary was ratified by the General Meeting on the 27 June. However, at the request of Mr. LEVEL (*Local Railways, France*), a 13th clause was added to those put forward by the section; this 13th clause reads as follows :

« 13. — The above recommendations « refer to main lines only and do not « apply to light railways. »

QUESTION II.

Breaking of rails. — Joints.

A) Initial causes of breaking of rails : means employed to reduce the number of these breakages, as much from the point of view of the method of use as from that of the specification of material employed;

B) Rail joints : most economical and effficient arrangement.

Preliminary documents.

1st report (America), by Mr. W. C. CUSHING. (See English edition of the *Bulletin*, October 1924, p. 677, or separate issue [which red cover] No. 1.)

2nd report (British Empire), by Mr. C. J. BROWN. (See English edition of the *Bulleletin*, May 1925 (1st part), p. 1403, or rate issue [with red cover] No. 35.)

3rd report (France), by Messrs. MERKLEN and CAMBOURNAC. (See English edition of the *Bulletin*, May 1925 (1st part), p. 1289, or separate issue [with red cover] No. 35.)

4th report (other countries), by Mr. J. WILLEM. (See English edition of the *Bulletin*, May 1925 (1st part), p. 1403, or separate issue [with red cover] No. 35.)

Special reporter : Mr. MERKLEN. (See English edition of the *Bulletin*, June 1925, p. 2085.)

Report of the 1st section.

(See *Daily Journal of the session*, Nos. 5, p. 4, 6, p. 3 and 7, p. 2.)

THE PRESIDENT opened the meeting by calling on Mr. Merklen to read his special report based on the reports of Mr. Cushing, Mr. Brown, Messrs. Merklen and Cambournac and Mr. Willem.

Mr. MERKLEN (*special reporter*) gave a short summary dealing with the principal points referred to in his special report. He mentioned especially the principal defects in rails arising from piping, segregation and from brittleness, and showed that the ideal conditions would be to have steel which was homogeneous and not brittle. He drew attention to a secondary cause in the breakage of rails due to the slipping of engines. He also mentioned the importance of transverse cracks in the head of the rail arising from defective manufacture. He called the attention of the meeting to a very interesting publication on micro-piping in the *Revue de Métallurgie* for May last, which may be akin to the production of transverse fissures He also showed that to avoid as far as possible defects in rails very close collaboration should be established between railway engineers and the steel makers.

Among the improvements made during recent years, special importance may be attached to pouring the ingot in an inverted position with a « sink-head », and to heat treatment of rails.

The application of these two perfected processes would no doubt produce steel which is neither segregated nor brittle and would prevent fractures, especially those caused by cracks in the upper surface of

the rail or in the parts held in the fish plates. These two classes of fracture — which are the most frequent — have been investigated by Mr. Frémont, who recommends the use of steel which is not brittle, especially in a direction perpendicular to the direction of rolling.

Mr. Willem (*reporter*) then gave an extremely interesting report of recent information obtained on the Japanese railways. These had not been able, on account of the earthquakes, to provide the information asked for in time for the special report. Special attention may be directed to a new apparatus, the « Magnetic Rail Defectoscope », which by variations in the deflection revealed hidden defects in rails in service or in new material. The testing of a rail takes at most two minutes. This information, which appears to open up a new field in the inspection of rails was received with very great interest by the meeting. This note is accompanied by very interesting diagrams which show what can be determined by means of this apparatus.

The President then called upon Mr. Cushing, whose very able report had been greatly appreciated by the delegates.

Mr. Cushing (*reporter*) referred briefly to certain points in his report. He drew attention to the difficulties found in America to provide a rail section fulfilling the requirements of the traffic. The traffic department have often forestalled us by putting into service vehicles with heavier axle loads than that for which the track is designed.

The « American Society of Civil Engineers » in view of this state of affairs has appointed committees, who in their reports have stated the important points in the problem, and have designed the necessary sections. The « American Railway Engineering Association » is at the present time dealing with this question.

It is also important that the quality of the steel should be suitable for the purpose. With this object, co-operation between the metallurgists and the railway engineers is necessary. The principal progress which appears to have been achieved up to the present is the general use of the pouring of the ingots in an inverted position invented by Sir Robert Hadfield and heat treatment of rails with the object of increasing the hardness of the rolling surface and its resistance to wear.

The President then called upon Mr. Brown.

Mr. Brown (*reporter*) drew attention to the advantages which might be obtained by standardising statistics dealing with rail breakages. Under present conditions a comparison between the various railways was almost impossible. Some systems, as the Canadian National Railway, include all defective rails whether broken or merely defective.

It would appear, from the information quoted, that the majority of breakages occur at the joints; it would therefore be an advantage to improve the joint especially by increasing the length of the rails.

In England the problem is evidently not the same as in America. Axle loads are much less and the problem of rail breakages scarcely exists. However, the fact that such do occur renders it a subject for investigation.

The President then called upon Mr. Merklen.

After reading a summary of his special report, drawn up in collaboration with

Mr. Cambournac, Mr. MERKLEN again drew the attention of the delegates to certain special points in his original report. He gave an interesting résumé of an article which had appeared in the *Revue de Métallurgie* on micro-piping due mainly to progressive crystallisation and gradual solidification of the crystals contained in suspension in a matrix during the cooling of the ingots.

In examining the breakages of new rails of the French standard section, a very large proportion of fractures were found to have occurred at the bottom of the rail head. These fractures appeared to be due to micro-piping.

An explanation of this defect is that it may be attributed to the constantly increasing weight of the ingots, which has risen from 800 kgr. to 6 tons (1 760 to 13 200 lb.).

The metal having a longer time to solidify, the attention of metallurgists should be directed to the possibility of pouring at a temperature only a little above the temperature of solidification.

THE PRESIDENT then called upon Mr. Cambournac.

Mr. CAMBOURNAC (*reporter*) had a few points to add to his report. He remarked that the type of fractures were much the same on all railways, but in proportion varying in accordance with the class of traffic. The principal causes were segregation where the traffic is light, and micro-piping in the case of the heavy traffic carried in America. He pointed out that the strength of rails might be increased either by increasing the section or the strength of the steel. At the present time there was a reaction against a high carbon content, which is one of the causes of brittleness and which gives rise to a large number of transverse fractures.

THE PRESIDENT then called upon Mr. Willem.

Mr. WILLEM pointed out that the process of manufacture of the steel should have an influence on the conditions required from the rails. For example, in America, Bessemer or Martin steel was used, while in Belgium only Thomas basic steel was used.

As regards breakages, it is necessary to establish a well defined classification. The table proposed by his colleagues and by himself is moreover very similar to the American classification.

In accepting rails, the most conclusive tests should be used : the limits of tensile stress to be adopted and macrographs. This investigation should be carried out by specialists. As regards the use of sorbitic rails and rails of special steel, he agreed that they should be used in places where the greatest wear and tear occurs, such as on sharp curves, etc. Their general use is limited by financial considerations.

After these remarks, the PRESIDENT proposed to proceed with the discussion of the successive clauses of the final summary. A discussion arose on clause 1 dealing with the drawing up of standardised classification to be used by all the companies for recording rail breakages during the year (see page 2093 of the *Bulletin* for June 1925).

The discussion took place between Messrs. MERKLEN, CAMBOURNAC, RAY (*Delaware, Lackawanna & Western Railroad*), BROWN, WILLEM, QUINQUET (*Paris-Lyons-Mediterranean Railway*), TETTELIN (*Northern Railway, France*), MAISON (*French Government*), HENRY and DES-

CUBES (*Eastern Railway, France*), CUSHING, WASIUTYNSKI (*Polish State Railways*) and DREYFUSS (*French State Railways*) on the subject of the first clause of the general summary.

Mr. RAY considered that a number of breakages on a train-kilometre basis might perhaps be useful on the continent of Europe, but was not of much value in America by reason of the very heavy axle loads; up to 70 000 lb. in the case of locomotives. The « American Railway Association » had adopted as a statistical basis a million ton-miles. One should in any case complete the information by an indication of the average axle load, without which a comparison would be impossible.

Mr. JULLIEN (*Paris-Orleans Railway*) remarked, however, that if the axle load was greater, the weight of the rail was also greater.

Mr. HENRY also considered that the ton-kilometre should be the statistical basis; a remarks column might show the nature of the track.

Mr. MAISON remarked that a quantitative analysis of the breakages per ton-kilometre is much less interesting than an indication of the principal causes of fracture.

The table should show how the fractures mentioned are divided up into various classes of fracture.

Messrs. CAMBOURNAC and MERKLEN did not agree with Mr. Maison.

The most interesting causes of fracture are those which occur most frequently, and any particular class of fracture corresponds to some particular cause. Further, a complete analysis of all the causes would be impossible.

Moreover, in this question one has to deal with the past and with the future. One can only take steps to improve the old types of rails when drawing up specifications for new rails. The discussion then turned on the classification, taking as a basis the weight of the rails.

Mr. WASIUTYNSKI asked that the ratio between the average weight of the rail and the average load should be shown and that the limit between the light rails and the heavy rails should be reduced from 42.5 kgr. to 40 kgr. (85 lb. to 80 lb. per yard).

Messrs. TETTELIN and STOÏKA also proposed 40 kgr. (80 lb.). Mr. HENRY considered that 40 kgr. is a light rail, and Mr. BROWN stated that the limit in the English classification was 42.5 kgr. (85 lb.). On the proposal of Mr. CUSHING and in order to include heavy American rails, rails should be classified into three categories, the middle category being 85 to 105 lb.

— This proposal was adopted.

A fresh discussion took place on the classification of rails according to age. Mr. TETTELIN proposed periods of ten years. Messrs. WILLEM, STOÏKA and HENRY considered that as new rails tested in accordance with up to date methods are the most interesting and that therefore the first period should be limited. Consequently the period of 5 years was retained.

A discussion then took place on the classification of breakages per train-kilometre.

THE PRESIDENT remarked that from a statistical point of view it might perhaps be difficult in some countries to substitute ton-kilometres for train-kilometres.

Mr. CUSHING considered that in any case

the Congress could only make quantitative comparisons. Qualitative investigations could only be carried out by companies themselves. For this reason the statistical basis which had been discussed for a long time in America lost its importance, and he believed that this was the reason for the observation by Mr. RAY, provided that one gave the maximum axle load.

Mr. RAY on the invitation of the PRESIDENT accepted this suggestion — the tonnage carried is an important element but the axle load is also an important element. The President also added that the weight of the rails is not always suitable for the axle loads carried, and for this reason it is important that the latter should be given.

Mr. TETTELIN remarked that it is absolutely necessary to give the weight of the rails, otherwise the statistics could not be compared owing to the different designs on various railways.

Mr. WASIUTYNSKI again pressed that the ratio between the axle load and the weight of the rail should be given.

Mr. DESCUBES and Mr. DESPRETS (*principal secretary*) pointed out that the average ratio of the axle load to the weight of the rail would not be sufficient data as regards the fatigue of rails and consequently as having a bearing on the breakages.

Fatigue of the track does not depend solely on the weight of the rail, but also on other details such as the type and pitching of the sleepers, ballast, etc.

Finally Messrs. CAMBOURNAC, MERKLEN and QUINQUET pointed out that the main object was to obtain statistic of rail breakages which at present were not in existence. If the information given in the table was made too complicated no good result would be obtained. The basis of comparison per train-kilometre had been selected because it is an easily obtained statistical figure which is in the possession of all the railways. Moreover, experience would show if the scheme was workable or if it was necessary to modify the information required.

Such modifications could be introduced at the next Congress.

On the proposal of the PRESIDENT, he agreed with this view and the table was adopted subject to the provision of an additional column which would give the maximum axle loads.

* * *

At the opening of the second meeting, Sir Henry FOWLER (*London Midland & Scottish Railway*) gave some information on the subject of segregation and the best means of detecting this. He pointed out that an analysis showing the carbon content is not always a satisfactory index of the segregation. Sulphur and phosphorus are the elements most closely connected with this phenomenon. For this reason sulphur prints are generally speaking a better indication of segregation than the ordinary method depending on the carbon content. He quoted a saying of a wellknown English metallurgist that if there were no sulphur in the steel it would be necessary to introduce some in order to reveal the segregation of the sulphur, phosphorus, etc.

THE PRESIDENT thanked Sir Henry Fowler for his interesting information, and proposed to continue the examination of the final summary, and read clause III giving the classification of breakages. He pointed out that this classification was quite complicated enough, and asked

the meeting if it would not be desirable to simplify it.

Mr. JULLIEN asked that additional information might be given stating where the rail is broken into pieces and into how many pieces.

Mr. WASIUTYNSKI wished that the limit of heavy rails should be reduced to 40 kgr. (80 lb.). After a fresh interchange of opinions, the PRESIDENT proposed to definitely adopt the American classification of 106 lb. to 140 lb., 85 to 105 lb. and light rails those less than 85 lb. The meeting agreed with this proposal.

Mr. MAISON then pointed out that if the classification appeared to be complicated, this is only so on the surface. A distinction had been made between old fractures and recent fractures. There was also a new element : the oval silvery spot.

Mr. MERKLEN (*special reporter*) informed Mr. Maison that this additional information was included in order to take into account facts observed in America.

On the proposition of the PRESIDENT, clause II was carried in full with an addition indicating the number of fragments into which the rail had broken.

The meeting then proceeded to examine clause III dealing with the initial causes of rail breakages.

THE PRESIDENT believed that there had been an error in translating this clause. In his opinion the oval silvery spot and the transverse fracture are totally different matters which should be separately classified.

Mr. RAY replied that in America the two defects were considered as being identical. The oval silvery spot in a freshly broken rail is merely a transverse fracture which has not yet reached the outer surface. It then becomes oxidised and blackened. In a broken rail a great number of fractures of this kind in an initial state are often detected.

Mr. MAISON then drew the attention of the meeting to a defect which had not been mentioned, but which was very important in his opinion; transverse fractures in the upper surface of the rail due to brake application and slipping. These cracks caused the rail to be brittle and led to their breaking into pieces as mentioned by Mr. Jullien.

These cracks are connected with the treatment of the metal. Obviously they are more frequently found in brittle metal. It would be advisable to try to discover the best heat treatment to avoid these and attempt to devise some means to reveal these in rails in service.

Mr. MERKLEN supported the views put forward by Mr. Maison. However, he considered that these cracks are not the cause of brittleness in the rail head. This is rather the effect of crystallisation in the rail head and one could remedy this by heat treatment which has given encouraging results.

Mr. JULLIEN also stated that his experience on the Orleans Railway bore out the remarks of his two colleagues. He stated that slipping produced self hardening of the rail.

Mr. MERKLEN added that he agreed with Mr. Jullien as regards the self hardening produced by slipping. This fact was first pointed out by the eminent French scientist Osmond to whom Mr. Frémont paid homage in his treaties on fractures.

The Meeting adopted clause III amend-

ed by the proposed addition of superficial cracks.

The discussion was then continued on clause IV relating to segregation.

Mr. Ray mentioned, in some interesting remarks, that in America attempts had been made to overcome segregation by making experimental rails of manganese steel. These rails of 105 lb. weight, laid at the end of 1920, had given good results up to the present. As a rule brittleness reveals itself in the first five years. The tests were so satisfactory that since that time they have rolled rails of 130 lb. weight with a high percentage of manganese and a reduction in the proportion of carbon.

Mr. C. P. Sandberg (*Siamese Government*) supported Mr. Ray's suggestions, and congratulated him on his very interesting information. It has always appeared strange to him that one should attempt to increase the hardness of rails by increasing the carbon content, an element which is very apt to segregate, while one could arrive at the same result by increasing the proportion of manganese which segregates very little.

Mr. Merklen remarked that Mr. Ray appeared to be of a different opinion to Mr. Cushing, who had pointed out that manganese steel had a low elastic limit. Moreover, this steel is very liable to piping. One could probably only overcome this defect by pouring the ingots in an inverted position with a large « sink head ».

Mr. Ray did not agree with Mr. Merklen. In America this difficulty has not been met. However, the steel works have had certain difficulties to overcome in making this new product.

Mr. C. P. Sandberg further urged that the carbon content should be reduced if the proportion of manganese was increased.

— Clause IV was finally adopted.

— Clause V dealing with macrographs was also adopted, as was also clause VI dealing with the heat treatment of rails.

An interchange of opinion then took place on clause VII : « Secondary causes of rail breakages. »

Mr. Ferreira (*Portuguese Railway Company*) in an interesting statement showed that among the most important causes of rail breakages were flats on wheels, especially on lines with steep gradients in mountainous country.

It is therefore necessary that the examination of rolling stock (tyres) should be very carefully carried out. He considered that this remark should be added to the clause.

Mr. Cambournac supported this suggestion which was more concerned with clause VIII.

— Clause VII was adopted after some remarks on the length of rails.

Mr. Maison then supported the remarks of Messrs. Ferreira and Cambournac as regards clause VIII. He made a similar observation on the importance of the vertical balance of locomotives. This opinion was partially shared by Messrs. Jullien, Wasiutynski and Despretz, and after further remarks by Mr. Quinquet on the particular influence of flat tyres, clause VIII was adopted with the inclusion of an amendment dealing with the balancing of engines and the condition of tyres on rolling stock.

The following final summary was adopted for submission to the General Meeting.

BREAKING OF RAILS.

Final summary.

« I. — Examination of the replies « relating to breakage of rails supplied « by the various administrations has been « made difficult, and their comparison « impossible, on account of the differ- « ences in the regulations of the res- « pective administrations under which « statistics are drawn up.

« It seems desirable that common « regulations dealing with the matter « should be adopted on the following « lines :

« *A*) Definition of breakages. — A rail « should be considered as broken when « completely separated into two or more « portions, or when a piece of the head « is broken off, causing an interruption « of the running surface.

« *B*) Classification of breakages ac- « cording to the weight of the rail per « unit of length; these should fall into « three categories — one for light rails « weighing under 85 lb. per yard « (42.5 kgr. per metre), the second for « medium rails 85 lb. to 105 lb. per yard « (42.5 to 52.5 kgr. per metre), and the « third for heavy rails of 106 to 140 lb. « per yard (53 to 70 kgr. per metre) and « upwards.

« *C*) Classification of breakages, ac- « cording to the age of the rails, in the « track, *viz.*, those having less than « 5 years, from 5 to 10, from 10 to 15, « from 15 to 20, and beyond 20 years.

« *D*) An index number of the break- « ages : The total number of breakages, « without distinction of weight and age « of the rails, on each administration, in « relation to traffic density by giving the « number of breakages per 10 000 000 « km.-trains or 6 250 000 train-miles.

« *E*) The information under *D* to be « supplied for each year on the annexed « form and sent yearly, before March 31 « of the ensuing year, to the Permanent « Commission, who will combine the « replies for common publication.

« II. — It appears desirable, in order « to follow up the study of the question, « that administrations should classify « breakages for the three categories of « rails (the light, medium and heavy) in « such a way as to give at least the follow- « ing particulars :

« *A*) Percentage of breakages in the « respective portions of the rails covered « by and clear of the fishplates.

« *B*) Percentage of fractures accord- « ing to the appearance of the fracture :

« *a*) Fresh and clean fracture through « the whole of the rail section :

« 1) With « silvery oval spot »;

« 2) Without « silvery oval spot ».

« *b*) Fractures, part of which are old « and strongly oxidised, extending to the « outer face of the foot or head of the « rail :

« 1) When the oxidised part is in the « foot;

« 2) When the oxidised part is in the « head.

« *c*) Fractures with strongly oxidised « portions not extending to the outer « face of the foot or head of the rail.

« *d*) The number of pieces into which « the rail is broken.

« III. — It appears desirable that the

. . . . . *Railway*

Fractures of rails occurring during the year . . . . .

DESCRIPTION OF RAILS.	*Age of rails :* *less than 5 years.* Number of fractures.	Length of single track of this class.	Number of fractures per 1 000 km. or per 625 miles.	*5 to 10 years.* Number of fractures.	Length of single track of this class.	Number of fractures per 1 000 km. or per 625 miles.		*more than 20 years.* Number of fractures.	Length of single track of this class.	Number of fractures per 1 000 km. or per 625 miles.	*Maximum axle load.*
Light rails, of a weight less than 42.5 kgr. per m., or 85 lb. per yard.	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . .	. . . . .	. . . . .	. . . . .
Heavy rails, 1) 85 to 105 lb. 2) 106 to 140 lb. and upwards.	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Total. . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .

Number of train-kilometres or train-miles. . . . . .
Total number of fractures . . . . . .

Number of fractures per 10 000 000 train-kilometres or 6 250 000 train-miles . . . . . .

« railway systems should take the necessary precautions for proceeding, either « on their own account, or in collaboration with the steel works, to an investigation of the initial causes of fracture « of rails. In particular, it would appear « desirable to study the failures that « occur through « transverse fissures », « a defect that is known in France by the « name of « silvery oval spot » (*tache « ovale argentée*), the primary cause of « which is not thoroughly understood; « also the study of fine cracks appearing « on the rolling surface of the rails « should be continued.

« IV. — The segregation found in the « metal of the greater number of fractured rails appears to be the most frequent « primary cause of the fractures observed; the attention of steel makers should « be directed to the necessity for continuing to endeavour to secure the total « elimination of segregation of the metal, « and it is necessary that provision should « be made against segregation by suitable « requirements laid down in the specification.

« V. — Macrographic tests tend to « facilitate examination for segregation. « It would be desirable to extend the use « of such tests, and improve them, so as « to make them of practical service in the « inspection of rails. The same remark « applies to tests on resilience.

« VI. — The heat treatment of rails « appears to have the effect of improving « the quality of the metal and reduces its « brittleness. It would be of interest to « follow up the experiments made with « heat-treated rails, which have given « encouraging results in the United States « and in France.

« VII. — Among the secondary causes « of rail breakages, the most important « must be considered to be shocks produced at the joints by the rolling loads. « It is advisable, therefore from this « point of view :

« *A*) on the one hand, to increase the « length of rails so as to reduce the number of joints, and

« *B*) on the other hand, to improve « the design of joints so as to suppress « or reduce the shocks caused by the « passage of the wheels.

« VIII. — It appears possible to reduce « the number of breakages in rails by « very careful maintenance of the track « and the exercise of close inspection of « the material forming it, so as to enable « rails to be removed as soon as they « begin to develop flaws which may « result, before long, in breakages.

« It would be advisable to study the « question of adequate apparatus for « detecting these flaws; particular attention should also be paid to the balancing of locomotives, and the condition of « all tyres. »

Rail joints.

The President opened the discussion on the question of rail joints by asking the reporters to read a brief summary of their special report on the final summary.

Mr. Merklen drew attention to a point in Mr. Cushing's report pointing out the fact that rail breakages are less on the New York Central than on the other lines. The cause was due to the use of long fish-plates supported by three sleepers, of which one was beneath the joint. This feature of long fish-plates had already been referred to by Haarmann in *Eisenbahngleise* in 1884.

After the summaries of Messrs. Cushing, Brown and Willem had been read, the PRESIDENT proposed to immediately proceed with the discussion of the recommendation of the general summary.

« CLAUSE 1. — Joints as presently constructed form the weakest part of the track and there is scope for improvement in the design, always bearing in mind that they should be composed of few pieces, be as simple as possible, cheap to instal and economical to maintain. »

— Carried.

« CLAUSE 2. — It would be advantageous to carry out on all administrations simultaneously tests of a certain number of joints which would appear to give better results, particularly :

a) Bridge joints, in which the ends of the rails rest on a metal bridging piece between the sleepers on each side of the joint;

b) Suspended joints, in which the sleepers on each side of the joint are brought close to each other;

c) Joints in which holes in the web of the rail are not required.

Mr. WASIUTYNSKI criticised the recommendation of joints of the bridge type which gave rise to inequalities in the upper surface of the rail as the result of differences in the heights of the rails.

He proposed to classify under *a*) the suspended type joints adopted by the Polish railways as the result of the 1900 Congress which gave complete satisfaction.

Mr. MERKLEN thought that Mr. Wasiutynski's point would be met by classifying under *a*) suspended joints. He stated that joints which did not necessitate holes in the web of the rail had been tested in France with encouraging results.

Mr. BROWN (*reporter*) and Mr. COUVREUX (*Midi Railway, France*) mentioned successful tests of joints with bridge type fish-plates.

Mr. F. S. HUGHES (*Bengal Nagpur Railway, British India*) also mentioned a type of short strengthened fish-plates used by the Bengal Nagpur Railway. They had resulted in extremely easy riding.

THE PRESIDENT, in supporting Mr. Hughes views, stated that they had tried these fish-plates on the London Midland and Scottish Railway with good results. They had however a disadvantage of very soon reaching the limit of wear.

— Clause 2 was finally adopted without modifications.

— Clauses 3, 4, 5 and 6 were adopted without discussion.

As regards clause 7, Mr. WASIUTYNSKI considered that one should specify the nature of metal used for fish-plates. To say that it should be free from segregation was not sufficient.

Mr. CAMBOURNAC pointed out to this gentleman that practice varies considerably in this respect, and it would be therefore impossible to lay down any definite rule.

— Clause 7 was adopted.

— Clause 8 was also adopted after a short discussion between Messrs. WASIUTYNSKI, WILLEM, C. P. SANDBERG and BROWN.

— Clause 9 was also adopted.

The text of the proposed final summary is as follows :

RAIL JOINTS.

Final summary.

« 1. — Joints as presently constructed « form the weakest part of the track and « there is scope for improvement in the « design, always bearing in mind that « they should be composed of few pieces, « be as simple as possible, cheap to instal « and economical to maintain.

« 2. — It would be advantageous to « carry out *on all administrations simul-* « *taneously* tests of a certain number of « joints which would appear to give « better results, particularly :

« *a*) Bridge joints, in which the ends « of the rails rest on a metal bridging « piece between the sleepers on each side « of the joint;

« *b*) Suspended joints, in which the « sleepers on each side of the joint are « brought close to each other;

« *c*) Joints in which holes in the web « of the rail are not required.

« 3. — The attention of engineers is « directed to the very great interest « which would attach to the design of a « joint in which the holes in the web « of the rail are not required and which « would tend to eliminate a considerable « proportion of the most frequent form « of rail breakage.

« 4. — Means for stopping creep of « rails should be provided independently « of the joints.

« 5. — The standard length of rails « should be increased as far as possible « so as to reduce the number of joints.

« 6. — The periodical lubrication of « fish-plates is to be recommended. The « parts should be removed so as to faci- « litate the examination of the end of the « rail covered by the plates.

« 7. — It is important to use, in the « manufacture of fish-plates, metal free « from segregation and other defects.

« 8. — The heat treatment of fish-plates « is to be recommended. Any abnormal « brittleness which may have been pro- « duced in the plates is thereby removed.

« 9. — The re-forming of the fish- « plates by re-forging when hot may be « recommended for the sake of economy. »

— The General Meeting ratified this final summary at the meeting held on 1 July 1925.

QUESTION III.

Shunting yards.

Shunting and marshalling yards for goods trains. Lay-out and organisation.

Preliminary documents.

1st report (all countries, except America, Belgium, France and the British Empire), by Mr. W. SIMON-THOMAS. (See English edition of the *Bulletin*, February 1925, p. 237, and May 1925 (2nd part), p. 2054), or separate issue [with red cover] No. 17.)

2nd report (America), by Mr. S. T. WAGNER. (See English edition of the *Bulletin*, October 1924, p. 793, or separate issue [with red cover] No. 2.)

Supplement to the 2nd report, by Mr. S. T. Wagner. (See English edition of the *Bulletin*, May 1925 [1st part], p. 1619, or separate issue [with red cover] No. 40.)

3rd report (British Empire), by Mr. R. H. NICHOLLS. (See English edition of the

Bulletin, November 1924, p. 877, or separate issue [with red cover] No. 4.)

4th report (France and Belgium), by Messrs. MOUTIER and PELLARIN. (See English edition of the *Bulletin*, May 1925 [1st part], p. 1495, or separate issue [with red cover] No. 36.)

Special reporter : Mr. W. SIMON-THOMAS. (See English edition of the *Bulletin*, June 1925, p. 2098.)

Report of sections I and III combined.

(See *Daily Journal of the session*, Nos. 2, p. 5; 3, p. 5 and 5, p. 3.)

PRESIDENT : MR. DU CASTEL,
President of the 3rd section.

THE PRESIDENT requested Mr. Simon-Thomas, *special reporter*, to read his special report. After the reading of the report the PRESIDENT proposed to save time by taking the various paragraphs of the summary in order, discussion to follow immediately on the reading of each paragraph.

1. — A shunting and marshalling yard, well situated in relation to the railway system, enables traffic to be conducted more rapidly, and increases the traffic capacity of the lines.

The arrangement depends on the organisation of traffic into through, semi-through and stopping trains, as required by the magnitude and distribution of the traffic.

These yards are situated at centres in which the traffic is sufficiently dense to necessitate distribution for the different routes.

Mr. PELLARIN (*reporter*) objected that this wording did not sufficiently define the principles which should govern the choice of situation of the shunting yard. He proposed that it should be at the starting point of an important traffic route, as for instance in a mining or industrial district. The function of the yard was then to organise the various currents of traffic.

Mr. LAMALLE (*Belgian State Railways*) supported Mr. Pellarin's views, and emphasized the importance of a carefully planned site in the rapid handling of rolling stock.

THE PRESIDENT then read a suggested revised wording for paragraph 1.

Mr. MAISON (*French Government*) considered that the traffic organisation referred to in sub-paragraph 2 did not possess the importance which had been attributed to it, and proposed the suppression of this sub-paragraph.

Mr. MOYRAND (*Northern Railway, France*) and Mr. LAMALLE recognised the force of Mr. MAISON's objection, and suggested that the word « arrangement » should be replaced by the word « lay-out ».

The paragraph thus amended was adopted :

« 1. — Shunting and marshalling yards increase the rapidity of transport, the capacity of the lines, and the movement of rolling stock.

« These yards are situated in centres where traffic is sufficiently dense to be divided amongst the various sections of the lines, particularly at junction points.

« The lay-out depends on the organisation of the traffic in through, semi-through and stopping trains, according to the importance and distribution of traffic. »

THE PRESIDENT then read paragraph 2,

which was thereupon open for discussion :

2. They comprise in general a group of reception or arrival sidings, a group of sorting sidings, and very frequently a group of sidings for making up according to destination, sidings for trains waiting for dispatch, and transhipment sheds.

Finally, the installation is completed by a disinfecting yard, a wagon repair section and a locomotive shed.

The length of a station of this kind may amount to from 3 to 5 km. (1.8 to 3.1 miles).

Mr. PRETORIAN (*Roumanian State Railways*) suggested that clauses 2 and 3 should be transposed, and that only the maximum length of station should be indicated.

Mr. MOUTIER (*reporter*) quoted the case of his own railways, and considered that it was not desirable to have disinfecting arrangements within a shunting yard.

Mr. MAISON supported the preceding observation, based on the French regulations which required that disinfection should take place after use.

He criticized the wording of clause 1, as all shunting yards did not possess the standard type of lay-out indicated.

After additional observations by Messrs. MOYRAND and LAMALLE, as to the order in which the various sidings should be laid down, the PRESIDENT proposed a revised wording of paragraph 2 :

« 2. — The length of such yards may be as much as 5 km. (3 miles). A yard consists usually of reception sidings, sorting sidings, and frequently of sidings for making up according to destination; also of sidings for trains waiting for departure, and tranship shed. Finally, the installation is completed by a wagon repair section, a locomotive shed and, where required, a disinfecting yard. »

— Adopted.

Mr. SIMON-THOMAS read paragraph 3 :

3. — The use of gravitation for shunting may be adopted in shunting yards by constructing these on a continuous gradient or on the level with humps. The first method is only to be recommended in case a natural gradient exists, and the number of wagons to be shunted does not exceed 5 000 per day.

An arrangement of shunting yard in which the formation is partially inclined, may have advantages, particularly in the case of groups of reception sidings and sidings for sorting according to geographical destination.

But in such case it is advisable to be able to perform the operations by means of locomotives at times when the atmospheric conditions are unfavourable and the working of the group of sidings by gravity is not satisfactory.

Mr. MOUTIER considered in the first place that it was not possible to indicate a maximum number of wagons, this number being very variable. Further, he only knew of one marshalling yard with a continuous gradient, *viz.*, that at Terre-Noire (P.-L.-M.).

Mr. LAMALLE shared Mr. Moutier's views. It would be desirable to decide, as regards yards which had a continuous gradient, whether certain sidings should not be on the level, and whether humps were not necessary. Movement appeared to be more rapid in yards which had humps.

Mr. TETTELIN (*Northern Railway, France*) and Mr. MOUTIER both remarked that in addition to the natural gradient, yards may be constructed with artificial gradients.

Mr. RENARD (*Eastern Railway, France*) stated that in the case of yards with continuous gradients, trains had to enter from one side only, thus necessitating an extra movement in the case of certain trains. He considered, however, that as regards splitting-up operations, continuous gradients were the most suitable.

Mr. PELLARIN observed that if a yard was to be constructed with a continuous gradient, the cost of construction would exceed the economy effected on shunting engines. On the other hand, it was not always possible to instal a reception loop. It would be desirable, therefore, not to make the paragraph too restrictive. The choice of system would depend above all on local conditions.

Mr. LE BESNERAIS (*Northern Railway, France*) considered that by avoiding crossing the yard and interrupting shunting operations, the loop meant a saving of time, which was of great importance.

Notwithstanding Mr. Renard's report, Mr. LAMALLE believed in the superiority of the hump.

THE PRESIDENT proposed a new wording of the paragraph, in which, on the suggestion of Mr. Le Besnerais, the word « yard » should be replaced by the word « sidings ».

Mr. GAEREMYNCK (*Belgian State Railways*) drew attention again to the importance of the net cost of shunting per wagon as a factor bearing on the choice of the type of yard.

After a further observation on a point of detail by Mr. PRETORIAN, the PRESIDENT read the revised text of paragraph 3, which was adopted, as follows :

« 3. — From the point of view of the use of gravitation for shunting, the yards can be established according to local conditions and configuration of the ground, either on a continuous gradient or on the level with a hump.

« In the former category are included yards in which the total incline is continuous, and yards partially inclined, particularly in the case of reception sidings and those for marshalling according to destination.

« In the latter case it is desirable to be able to perform the operations by means of locomotives in cases where, as a result of unfavourable atmospheric conditions, the working of the group of arrival sidings is not satisfactory.

« On continuous slope, yards do not appear advisable except in the case where the ground offers a natural gradient. »

Paragraph 4 was then read :

4. — A group of shunting sidings for each direction is necessary if the number of wagons to be shunted per day exceeds the capacity of a single hump. Otherwise, a single group of sidings is to be recommended for both directions of traffic, unless each direction of traffic is practically independent of the other.

In yards, however, which are arranged with a single group of shunting sidings, it is necessary to make provision so that the yard can be enlarged with groups of sidings for both directions of traffic when the traffic has increased.

Mr. PAYET (*French State Railways*) observed that the first condition for separating the two directions of traffic was that the traffic should be independent.

Mr. HENRY-GRÉARD (*Paris-Orleans Railway*) supported Mr. Payet's observation, stating that there were cases in which it was difficult to distinguish between the

two directions of traffic, and it was not desirable to make the capacity of the hump dependent on the direction of traffic.

Mr. MOUTIER considered that the expense of installing a double yard should only be incurred where the amount of traffic justified it. Further, it was not necessary that the two yards should be parallel, the arrangement depending *a priori* on the nature of the traffic.

Mr. LAMALLE added that if the capacity of the hump was not fully utilised, it was desirable to instal a loop to avoid conflicting movements of traffic.

Mr. PELLARIN again emphasized the fact that if the two directions of traffic were not clearly distinguished, the solution might be to open another yard some distance away, and not to enlarge the existing yard.

THE PRESIDENT and the delegates finally agreed to omit the final clause of this paragraph.

« 4. — A group of shunting sidings for each direction is advisable when the traffic in each direction is more or less independent of the others, otherwise a single group of sidings is preferable. This is also the case when the number of wagons to be split-up daily does not exceed the capacity of the hump. »

Paragraph 5 was then considered :

5. — It is necessary that the number of reception tracks should be such as to be able to receive the trains as they arrive, and consequently to avoid blocking up the main lines, and it is also necessary to provide for simultaneous entrance of trains coming on different lines.

The length of the reception lines should be sufficient to take the longest trains; the most practical arrangement consists in placing these lines immediately before the hump.

The discussion centred specially on the second clause. Mr. DESCUBES (*Eastern Railway, France*) observed that it was not always possible to lay the reception sidings in front of the hump. There were cases in which it was necessary to place them at the side, and to make use of draw-out tracks.

Mr. SIMON-THOMAS replied that such an arrangement necessarily diminished the capacity of the yard.

It was finally agreed that if the arrangement contemplated might be difficult to effect in certain cases owing to local circumstances, it was none the less always to be recommended from the operating point of view.

— Paragraph 5 was then adopted, as follows :

« 5. — It is necessary that the number of the section tracks be such that they can receive trains on arrival so as to avoid congestion on the main line, and it is also necessary to provide for the simultaneous entrance of trains arriving by different lines.

« The length of the reception lines must be sufficient for the longest trains. When the topographical conditions permit, the most practical arrangement consists in placing these lines in front of the hump. »

Mr. SIMON-THOMAS then read paragraph 6 :

« 6. — The preliminary operations for splitting-up the trains, which vary according to the arrangement of the yard and the traffic to be handled, should be carefully arranged so as to occupy the shortest time possible. This condition becomes

most essential in winter owing to the increased rolling resistance arising from the cooling of the oil in the axle-boxes. »

This paragraph was adopted without discussion.

Mr. SIMON-THOMAS read paragraph 7 :

7. — During the operation of splitting-up the train, the indication of the particular sidings given to the pointsman should be done in a simple and clear manner, equally capable of being worked by day, by night and during fog.

Apart from the method of using shunting tickets, an arrangement with electric push buttons at the hump, and an electric board in the cabin, appears to be the most practical.

THE PRESIDENT then called upon Mr. Pellarin.

Mr. PELLARIN considered that it was necessary to give the pointsman clear directions. On the Eastern Railways of France the ticket system has not proved satisfactory, especially in times of congestion. The system of push buttons with a board in the cabin had given satisfaction. At the present time the Eastern Railways were using a telephone at the hump with a loud speaker in the cabin, this system giving the best results. It could not therefore be said *a priori* that the electric system was the best.

THE PRESIDENT suggested that it would not be possible to go into too precise details.

Mr. LE BESNERAIS was in favour of the luminous board, visible from all parts of the yard. Mr. SIMON-THOMAS did not think such signals were visible during fog.

Mr. HENRY-GRÉARD considered that indications should also be given to the employees in the shunting sidings.

After certain further observations by Mr. PRETORIAN the revised text was read by the PRESIDENT and adopted, as follows :

« 7. — During the operation of splitting-up of the trains the indication of the particular sidings given to the pointsman and eventually to the rest of the shunting staff must be done in a clear and simple manner equally capable of being worked by day, night, or during fog. Methods vary according to circumstances, and among the systems in use the following are particularly interesting :

« 1) Shunting tickets;
« 2) Electric push buttons at the hump;
« 3) Electric indicator in the pointsman's cabin;
« 4) Loud-speaking telephones;
« 5) Luminous signals;
« 6) Luminous indicators, showing the number of the siding to which the wagon is destined, visible from all points of the yard. »

Paragraph 8 was then discussed.

Both Mr. PELLARIN and Mr. LAMALLE objected to the second clause. The ringing of bells in the cab of the engine would distract the driver. It was further an arrangement which was both difficult to instal and unreliable.

Replying to a question by Mr. DESCUBES, Mr. SIMON-THOMAS stated that the arrangement was used with complete success in Germany.

THE PRESIDENT proposed a new wording setting out the means of communication between the driver, the foreman shunter and the pointsman, and this wording was

adopted after remarks by Mr. MOUTIER and Mr. LAMALLE.

« 8. — If it is necessary to have a shunting engine, communication between the driver of the shunting engine and the foreman shunter and pointsman should be such that the orders given by the latter to the driver can be carried out immediately.

« Amongst the various systems the following may be noted :

« *a*) Luminous signals;

« *b*) Electric bells in the cab of the engine. »

Mr. SIMON-THOMAS read paragraph 9, which was adopted, as follows, after slight modification suggested by Mr. MOUTIER :

« 9. — It is necessary to design the hump or the grade at the splitting-up sidings as accurately as possible, taking account of the various resistances that affect the running of the wagons as they come over.

« The influence of the wind resistance being considerable, the splitting-up sidings should be arranged, as far as possible, in the most favourable direction in relation to the prevalent winds. »

Paragraph 10 was adopted without modification :

« 10. — The radius of curvature of the top of the hump in vertical section should be at least 200 m. (10 chains). »

The following draft for paragraph 11 was then read by Mr. SIMON-THOMAS :

11. — The height of the hump should be such that all the wagons attain sufficient speed to enable them to reach their destinations on the shunting lines, even when atmospheric conditions are unfavourable. The speed should be such that the wagons are spaced sufficiently far apart on reaching the foot of the steep gradient of the hump.

This speed should, moreover, be obtained by means of a uniformly steep gradient.

The speed of the wagons must be reduced by means of a rail-brake. The automatic rail-brake with counterweight, in which the action is exerted by four brake-rails arranged on both sides of the track-rails, is preferable to any other methods.

Mr. PELLARIN had no objection to raise to the first two clauses, but proposed the omission of the last, it being very questionable whether the automatic rail-brake was preferable to all others. This system works exclusively by the weight of the wagon, whereas the important factors are above all the speed of the wagon and the number of wagons already on the track.

THE PRESIDENT pointed out that different systems of braking would apply according as the yard was on a continuous gradient or had a hump.

Mr. MOUTIER supported Mr. Pellarin's objections. The rail-brake did not allow for the nature of the load. The Northern Railways of France had adopted an automatic system involving the use of ordinary slipper brakes which acted at the distance judged suitable by the employees according to the circumstances of the moment, the nature of the load, etc.

Messrs. PRETORIAN, DESCUBES and MAISON also spoke regarding the height of the hump, the spacing of wagons, atmospheric conditions, etc. Finally the PRESIDENT proposed, and it was agreed, to replace paragraph 11 as originally worded by two new paragraphs, 11 and 12, which would read as follows :

« 11. — The height of the hump or the

gradient of the continuous slope should be such that all the trucks, whatever their running conditions, attain sufficient speed to reach their correct destination on the shunting lines. This result ought to be obtained even under unfavourable atmospheric conditions. The speed should, moreover, be such that when the points are reached the trucks have sufficient interval between them.

« 12. — It must be possible to reduce the speed of the trucks if need be. Various systems are in use for this purpose. Amongst these mention may be made of slipper brakes, automatic rail brakes, and electrically controlled slipper brakes. »

The original paragraph 12 (which would become paragraph 13) was then read :

The construction of a hump with two arrival tracks at different levels is only necessary when the difference between favourable and unfavourable atmospheric conditions is such that a hump constructed for the most unfavourable conditions does not allow of the wagons being stopped effectively under the most favourable conditions.

After various objections had been stated by Messrs. GAEREMYNCK, LAMALLE and PRETORIAN, and the PRESIDENT had pointed out the necessity of distinguishing between favourable and unfavourable conditions, the following wording was adopted for the new paragraph 13 :

« 13. — The construction of a hump having two different levels is only necessary if a hump with a single level, designed to deal with traffic under the most unfavourable conditions, imparts too great a speed to enable the trucks to be stopped when circumstances are favourable. »

Mr. SIMON-THOMAS then read the original paragraph 13 :

At humps arranged with a single arrival track, a track adjacent to the hump, constructed on the level, may be used with advantage as a road on which the auxiliary locomotive used for pushing up the wagons on the shunting siding may stand.

At the request of Mr. LAMALLE, Mr. SIMON-THOMAS explained that when atmospheric conditions were unfavourable it might be necessary to have an auxiliary shunting engine to push into their proper position any wagons which had stopped on the slope.

An exchange of views took place between Mr. WASIUTYNSKI (*Polish State Railways*), the PRESIDENT, Mr. PELLARIN, Mr. LAMALLE and Mr. PAYET as to the desirability of having avoiding lines or in certain cases a dead-end siding.

Messrs. MAISON and MOUTIER questioned the utility of this paragraph and proposed its omission.

After some remarks by Mr. DESCUBES the following wording was finally agreed upon :

« 14. — It is usually advisable to have loops round the hump, and sometimes a special dead-end for the shunting engine used for pushing up trucks which have stopped short. »

The original paragraph 14 was then discussed :

The head of the group of shunting sidings should be arranged as near as possible to the top of the hump or the first pair of points.

The minimum distance between the top of the hump and the first pair of points should be 15 metres (50 feet).

It is necessary that the head of the

group of sidings should be so arranged that the tracks do not give too great differences of resistance in relation to one another, and that the distance from the foot of the gradient to the fouling point should be as short as possible, and nearly the same for all tracks.

If necessary, the head of the group of sidings may be constructed on a plane of sufficient inclination to overcome the resistances due to the curves and reverse curves.

Mr. WASIUTYNSKI considered that the minimum distance of 15 metres was too short. It would correspond to a hump having a height of 60 cm. (2 feet).

Mr. SIMON-THOMAS replied that the case arose in Switzerland. At Zurich the distance was 9 metres, and this worked satisfactorily.

Mr. MAISON considered that the wording should be restricted to general observations, omitting precise details.

After observations by Mr. MOUTIER and the PRESIDENT the new paragraph 15 was adopted.

Mr. DESCUBES asked to be allowed to speak. He remarked that account had not been taken of a suggestion in the report of Messrs. MOUTIER and PELLARIN, advising the concentration of the working of points, working from a distance by cables or by fluid pressure, and the use of pedals, etc.

Mr. MOUTIER supported the inclusion of this suggestion, and pointed out that the advantage of control from a distance consisted not only in a saving of staff but also in greater speed and regularity of working.

THE PRESIDENT proposed to reconsider later the text suggested by Mr. Descubes. (*Agreed.*)

Mr. LAMALLE then pointed out the desirability, when constructing new yards, of laying the lines in front of the hump at a higher level than the lines behind. This reduced the work of the shunting engines and gave a lower net cost per wagon handled.

The former paragraph 15 was then discussed :

The number of tracks in the shunting sidings depends on the traffic to be handled, and on the instructions relating to the make-up of the goods trains. In determining this number account must be taken of the maximum possible, that is, 35 to 40 for level yards with humps. The fact that the addition of sidings for some supplementary routes may appreciably facilitate the make-up of semi-through trains must not be overlooked.

The effective length of the shunting sidings depends on the length adopted for the through trains, with the addition of a certain length corresponding to the distance necessary for stopping the last wagons.

In yards arranged on a continuous gradient it is necessary that the slope of the shunting sidings should be from 5 to 7 per thousand in order that the sets of wagons may be set running under the action of gravity alone.

Mr. WASIUTYNSKI pointed out that a slope of 5 to 7 per thousand appeared insufficient. This had been the experience at Nuremberg.

Mr. PRETORIAN proposed a revised wording for the second clause which would more fully cover all requirements of the service. After observations by Messrs. MAISON and LAMALLE, the PRESIDENT read the revised text, which was adopted, as follows :

« 17. — The number of tracks in the

shunting sidings depends upon the traffic to be handled (density of traffic, number of destinations, and local conditions), and on instructions relating to the make-up of the goods trains. In determining this number account must be taken of the maximum possible — that is, 35 to 40 — for level yards with humps. The fact that the addition of sidings for some supplementary routes may appreciably facilitate the make-up of semi-through trains must not be overlooked.

« The effective length of the shunting sidings depends on the maximum length allowed for the trains, and should be sufficient, if necessary, to enable marshalling to take place on the head of the sidings opposite to the branching off point; the length of the shunting lines should be increased by an amount equal to the distance required for stopping the last trucks.

« In yards arranged on a continuous gradient it is necessary that the slope of the shunting sidings should be at least 1 in 200, in order that the batches of wagons may be set running under the action of gravity alone. »

THE PRESIDENT read the former paragraph 16 :

In yards arranged on the level, departure direct from the shunting sidings is advisable, unless the density of traffic requires the transfer of trains to groups of departure sidings immediately after marshalling.

Mr. PRETORIAN considered that departure direct from shunting sidings was not to be recommended; it was difficult to carry out the preliminary operations on those sidings.

Mr. LAMALLE shared this view.

The paragraph was finally adopted, as follows :

« 18. — In yards arranged on the level, departure direct from the shunting sidings is advisable wherever this is possible, unless the density of the traffic requires the transfer of trains to groups of departure sidings immediately after marshalling. »

Paragraph 17 of the special report read as follows :

The number of connecting tracks between the shunting sidings, sorting sidings and departure sidings, as well as the number of groups of sorting sidings necessary for easy working, depends on the number of trains to be made up, and on the instructions relating to their make-up.

On the proposition of Mr. PAYET this paragraph was deleted as being self-evident.

Paragraphs 19 and 20 were adopted, as follows :

« 19. — In yards constructed on a continuous gradient, the groups of sorting sidings follow the group of shunting sidings; in yards on the level with humps, the most practical arrangement of the sorting sidings is alongside the shunting sidings.

« 20. — An arrangement of the group of sorting sidings on a down gradient has advantages, and increases the output of the yard. »

Paragraph 21 was adopted, after a remark by Mr. RENARD as to the suggested effective length of 200 m. (220 yards) :

« 21. — The number of tracks in a group of sorting sidings, generally from 12 to 14, depends on the instructions relating to the make up of those trains

that comprise the greatest number of destinations; an effective length of 200 m. (220 yards) is generally sufficient for these tracks; a group of sidings with access at both ends is preferable to a group of dead-end sidings. »

Paragraph 22 was adopted :

« 22. — In yards constructed on a continuous gradient, it is useful to arrange a small group of correction sidings, placed between the sorting group and the departure group. A group of this kind appears to be equally desirable at the end of a sorting group of sidings having a down grade. »

Paragraph 22 of the special report was cancelled on the proposition of Messrs. Payet and Maison. This paragraph read as follows :

The use of strong and new material for the construction of groups of shunting and sorting sidings is essential.

Paragraph 23 was adopted :

« 23. — The groups of departure sidings should serve as standing room for the trains that have been made up, and are awaiting the time for their departure. They should also exercise a regulating function in case of disturbance of traffic on the main lines.

« The number of departure tracks depends on these two functions, and account must be taken of the possibility of trains leaving the shunting sidings direct. »

Paragraph 24 was commented upon by Messrs. Pretorian, Simon-Thomas, Payet and Wasiutynski. In America the brakes were tested on each wagon.

— The paragraph was finally adopted :

« 24. — In certain countries where goods trains are fitted with an automatic compressed-air brake, the departure tracks should be provided with a supply pipe connected to a compressor to allow the air brake to be tried on the train before it leaves the station. »

— Paragraph 25 was adopted, as follows, after a modification in the wording proposed by Mr. Moutier, who said that it was not always convenient to have the sorting sidings alongside the arrival sidings :

« 25. — In yards which have to provide for through trains and semi-through trains overtaking others, it is necessary that groups of lie-by sidings specially reserved for this object should be provided. »

— Paragraph 26 was adopted :

« 26. — The number and arrangement of the roads that afford communication between the various portions of the yard are of very great importance. To avoid level crossings, tracks arranged for the independent running of the locomotives may be constructed with a maximum gradient of 1 in 30. »

— Paragraph 27 was adopted after the wording had been modified by the President to meet the various opinions which had been expressed :

« 27. — Certain systems adopt the principle of a small group of sidings specially intended for holding front vans; it is advisable that these sidings should be arranged so that the vans can be easily uncoupled and removed by the main line locomotives. »

— Paragraph 28 was adopted :

« 28. — In large shunting yards, small coal stages, with water cranes for filling

up the shunting locomotives, arranged near the places in which these locomotives usually work, are advantageous. »

— Paragraph 29 was adopted after remarks by Messrs. PAYET, MAISON, MOUTIER, LAMALLE, ANDREAE (*Swiss Federal Railways*) and DESCUBES :

« 29. — Where a weighbridge is provided, it should be so arranged that the truck running over it can be pushed direct over the splitting-up points. »

— Paragraph 30 was adopted after Messrs. WASIUTYNSKI and LAMALLE had pointed out that it referred to shops for small repairs :

« 30. — Repair shops for rolling stock should be placed in proximity to the shunting yard. »

— Paragraph 31 was amended after discussion, and adopted as follows :

« 31. — In most cases, the traffic organisation, particularly at large junctions, requires the addition of transhipment installations at shunting yards. In yards having separate shunting sidings for each of the two directions of circulation of the traffic, the most practicable site for the transhipment installation is generally in the centre of the yard.

« In frontier stations, customs-houses should be connected with the shunting yard. »

— Paragraph 32 of the special report, relating mainly to methods of transhipment, was cancelled on the suggestion of Mr. PAYET.

— Paragraphs 34 and 35 of special report, and the final sub-paragraph of paragraph 33, were cancelled, as being rather of general interest, and not applying particularly to shunting yards.

Mr. ANDREAE proposed an additional paragraph with reference to frontier stations — supplementary to paragraph 31.

Mr. DESCUBES suggested a wording for a paragraph concerning the control of points from a central cabin. (New paragraph 16.)

Mr. GORDON (*North Western Railway of British India*) emphasized the importance of having a traffic controller in each shunting yard.

THE PRESIDENT remarked that this question could be more usefully discussed in connection with the dispatching system.

Discussion at General Meeting held on 27 June.

THE PRESIDENT then puts to the meeting the paragraphs proposed jointly by the first and third sections.

Mr. SIMON-THOMAS, *special reporter*, was not quite satisfied with the wording of paragraph 12. There exists a marked difference between the various methods of braking, to which he has called attention specially in his report.

On the Continent, up to the present, a shoe-brake alone had been considered satisfactory, especially the brake made by the Bussing Company, which was largely employed in Denmark, Sweden, Switzerland, Tcheco-Slovakia and Germany, and which had been applied mechanically in France since 1924.

At the present time there was also another and quite different method, which consisted of obtaining retardation by means of braking rails placed inside and outside the track. One brake of this kind, the invention of Mr. Hannauer, was installed in the Gibson Station of the Indiana Railway. Other systems again had been described in Mr. Simon-Thomas' report.

He proposed the following wording, which was adopted by the meeting :

« 12. — The speed of wagons should be reduced when required. In order to carry this out there are various manual and mechanical methods, amongst which may be noted slipper brakes, different varieties of check rail brakes, some of which are dependent upon the weight of the wagon, etc. »

Mr. PRETORIAN observed that the wording of paragraph 15 did not agree exactly with the wording adopted; he proposed to replace the words « the bottom of the slope of the gradient » by « the set of points at the head of the sidings ».

This modification was accepted by the meeting.

Paragraph 15 therefore became :

« 15. — The distance between the top of the hump and the set of points nearest to the head of the sidings should be as short as possible. The lay-out of the head of the sidings should be such that there is no great difference between the resistances offered by the different roads, that the distance between the points at the head of the group of sidings and the fouling point should be reduced to a minimum, and so far as possible the same for all the roads.

« If necessary, the head of the sidings can be given a sufficient incline to overcome resistances due to curves and reverse curves. »

The remaining paragraphs were approved without comment.

THE PRESIDENT. — Here then is the final summary :

Final summary.

« 1. — Sorting and marshalling yards « enable traffic to be conducted more « rapidly and increase the traffic capacity « of the lines as well as the effective use « of rolling stock.

« These yards are placed at centres in « which the traffic is sufficiently dense « to necessitate distribution over the « different routes, especially at communication points.

« The lay-out depends on the organisation of traffic into through, semi-through and stopping trains as required by the extent and distribution of the traffic.

« 2. — The length of these stations « may amount to three miles. They comprise in general arrival sidings, sorting sidings and, fairly frequently, marshalling sidings, sidings for making up according to destination, sidings for trains waiting for departure and transhipment sheds.

« Finally, the installation is completed « by a wagon repair section, a locomotive « shed and a disinfecting yard, if required.

« 3. — From the point of view of the « use of gravitation for shunting, the « yards can be established according to « local conditions and configuration of « the ground, either on a continuous gradient or on the level with a hump. « In the former category are included « yards in which the total incline is continuous, and yards partially inclined, « particularly in the case of reception « sidings and those for marshalling according to destination. In the latter « case it is desirable to be able to perform the operations by means of locomotives in cases where, as a result of « unfavourable atmospheric conditions, « the working of the group of arrival « sidings is not satisfactory.

« On continuous slope, yards do not

« appear advisable except in the case « where the ground offers a natural slope.

4. — A group of shunting sidings for « each direction is advisable when the « traffic in each direction is more or less « independent of the others, otherwise a « single group of sidings is preferable. « This is also the case when the number « of wagons to be split up daily does not « exceed the capacity of the hump.

« 5. — It is necessary that the number « of the section tracks be such that they « can receive trains on arrival so as to « avoid congestion on the main line, and « it is also necessary to provide for the « simultaneous entrance of trains arriv- « ing by different lines.

« The length of the reception lines « must be sufficient for the longest trains. « When the topographical conditions « permit, the most practical arrangement « consists in placing these lines in front « of the hump.

« 6. — The preliminary operations for « splitting-up the trains, which vary ac- « cording to the arrangement of the yard « and the traffic to be handled, should « be carefully arranged so as to occupy « the shortest time possible. This con- « dition becomes most essential in winter « owing to the increased rolling resistance « arising from the cooling of the oil in « the axle-boxes.

« 7. — During the operation of splitt- « ing-up of the trains the indication of « the particular sidings given to the « pointsman and eventually to the rest of « the shunting staff must be done in a « clear and simple manner equally ca- « pable of being worked by day, night, « or during fog.

« Methods vary according to circum- « stances, and among the systems in use « the following are particularly interest- « ing :

« *a*) Shunting tickets;

« *b*) Electric push buttons at the hump;

« *c*) Electric indicator in the points- « man's cabin;

« *d*) Loud-speaking telephones;

« *e*) Luminous signals;

« *f*) Luminous indicators, showing the « number of the siding to which the wa- « gon is destined, visible from all points « of the yard.

« 8. — If it is necessary to have a « shunting engine, communication be- « tween the driver of the shunting engine « and the foreman shunter and points- « man should be such that the orders « given by the shunter can be carried out « immediately by the driver.

« Amongst the various systems the fol- « lowing may be noted :

« *a*) Luminous signals.

« *b*) Electric bells in the cab of the « engine.

« 9. — It is necessary to design the « hump or the grade at the splitting-up « sidings as accurately as possible, taking « account of the various resistances that « affect the running of the wagons as « they come over.

« The influence of the wind resistance « being considerable, the splitting-up « sidings should be arranged, as far as « possible, in the most favourable direc- « tion in relation to the prevalent winds.

« 10. — The radius of curvature of the « top of the hump in vertical section « should be at least 200 m. (10 chains).

« 11. — The height of the hump or the « gradient of the continuous slope should « be such that all the trucks, whatever « their running conditions, attain suffi-

« cient speed to reach their correct destin-
« ation on the shunting lines. This
« result ought to be obtained even under
« unfavourable atmospheric conditions.

« The speed should, moreover, be such
« that when the points are reached the
« trucks have sufficient interval between
« them.

« 12. — It must be possible to reduce
« the speed of the trucks if need be.
« Various systems are in use for this pur-
« pose. Amongst these mention may be
« made of slipper brakes, whether me-
« chanical or not, the system of braking
« by means of counter-rails, whether
« automatic or not, acting under the in-
« fluence of the weight of the wagons, etc.

« 13. — The construction of a hump
« having two different levels is only ne-
« cessary if a hump with a single level,
« designed to deal with traffic under the
« most unfavourable conditions, imparts
« too great a speed to enable the trucks to
« be stopped when circumstances are
« favourable.

« 14. — It is usually advisable to have
« loops round the hump, and sometimes
« a special dead-end for the shunting en-
« gine used for moving trucks standing
« in the sidings.

« 15. — The distance between the top
« of the hump and the set of points
« nearest to the head of the sidings
« should be as short as possible. The
« lay-out of the head of the sidings should
« be such that there is no great difference
« between the resistances offered by the
« different roads, that the distance be-
« tween the points at the head of the
« group of sidings and the fouling point
« should be reduced to a minimum, and
« so far as possible the same for all the
« roads.

« If necessary, the head of the sidings
« can be given a sufficient incline to
« overcome resistances due to curves and
« reverse curves.

« 16. — In order to economise staff,
« increase the rate of splitting-up trucks,
« and avoid errors, it is advisable that the
« points at the head of the sidings should
« be controlled from central cabins; these
« cabins control the points either by
« means of wires or hydraulic power, and
« some systems include safety bars which
« prevent the movement of switches
« under the wheels of the trucks. Use is
« also made of semi-automatic apparatus
« which allows the shunter to work with
« one movement all the points giving
« access to one shunting line, the points
« moving on the approach of wagons.

« 17. — The number of tracks in the
« shunting sidings depends upon the
« traffic to be handled (density of traffic,
« number of destinations, and local con-
« ditions), and on instructions relating to
« the make-up of the goods trains. In
« determining this number account must
« be taken of the maximum possible —
« that is, 35 to 40 — for level yards with
« humps. The fact that the addition of
« sidings for some supplementary routes
« may appreciably facilitate the make-up
« of semi-through trains must not be
« overlooked.

« The effective length of the shunting
« sidings depends on the maximum length
« allowed for the trains, and should be
« sufficient, if necessary, to enable mar-
« shalling to take place on the head of
« the sidings opposite to the branching
« off point; the length of the shunting
« lines should be increased by an amount
« equal to the distance required for stop-
« ping the last trucks.

« In yards arranged on a continuous

« gradient it is necessary that the slope « of the shunting sidings should be at « least 1 in 200, in order that the batches « of wagons may be set running under « the action of gravity alone.

« 18. — In yards arranged on the level, « departure direct from the shunting « sidings is advisable wherever this is « possible, unless the density of the « traffic requires the transfer of trains « to groups of departure sidings imme- « diately after marshalling.

« 19. — In yards constructed on a « continuous gradient, the groups of « sorting sidings follow the group of « shunting sidings; in yards on the level « with humps, the most practical arrange- « ment of the sorting sidings is alongside « the shunting sidings.

« 20. — An arrangement of the group « of sorting sidings on a down gradient « has advantages, and increases the out- « put of the yard.

« 21. — The number of tracks in a « group of sorting sidings, generally « from 12 to 14, depends on the instruc- « tions relating to the make up of those « trains that comprise the greatest num- « ber of destinations; an effective length « of 200 m. (220 yards) is generally suffi- « cient for these tracks; a group of « sidings with access at both ends is « preferable to a group of dead-end « sidings.

« 22. — In yards constructed on a con- « tinuous gradient, it is useful to arrange « a small group of correction sidings, « placed between the sorting group and « the departure group. A group of this « kind appears to be equally desirable at « the end of a sorting group of sidings « having a down grade.

« 23. — The groups of departure « sidings should serve as standing room « for the trains that have been made up, « and are awaiting the time for their « departure. They should also exercise « a regulating function in case of « disturbance of traffic on the main « lines.

« The number of departure tracks « depends on these two functions, and « account must be taken of the possibility « of trains leaving the shunting sidings « direct.

« 24. — In certain countries where « goods trains are fitted with an auto- « matic compressed-air brake, the depar- « ture tracks should be provided with a « supply pipe connected to a compressor « to allow the air brake to be tried on the « train before it leaves the station.

« 25. — In yards which have to pro- « vide for through trains and semi- « through trains overtaking others, it is « necessary that groups of lie-by sidings « specially reserved for this object should « be provided.

« 26. — The number and arrangement « of the roads that afford communication « between the various portions of the yard « are of very great importance. To avoid « level crossings, tracks arranged for the « independent running of the locomotives « may be constructed with a maximum « gradient of 1 in 30.

« 27. — Certain systems adopt the prin- « ciple of a small group of sidings « specially intended for holding front « vans; it is advisable that these sidings « should be arranged so that the vans can « be easily uncoupled and removed by « the main line locomotives.

« 28. — In large shunting yards, small

« coal stages, with water cranes for filling « up the shunting locomotives, arranged « near the places in which these locomo- « tives usually work, are advantageous.

« 29. — Where a weighbridge is pro- « vided, it should be so arranged that the « truck running over it can be pushed « direct over the splitting-up points.

« 30. — Repair shops for rolling stock « should be placed in proximity to the « shunting yard.

« 31. — In most cases, the traffic orga- « nisation, particularly at large junctions, « requires the addition of transhipment « installations at shunting yards. In « yards having separate shunting sidings « for each of the two directions of cir- « culation of the traffic, the most prac- « ticable site for the transhipment instal- « lation is generally in the centre of the « yard.

« In frontier stations, customs-houses « should be connected with the shunting « yard.

« 32. — The arrangement of the loco- « motive shed and the organisation of its « supplies are of great importance. It is « necessary that the connections between « the locomotive shed and other parts of « the yards should be conveniently ar- « ranged and sufficient in number. »

SECTION II.

Locomotives and rolling stock.

President : M. WEISS.

Vice-presidents : A. FABRIS, H. N. GRESLEY, Dr R. HEROLD and M. LACOIN.

Principal secretary : E. MINSART.

QUESTION IV-A.

Reduction of the cost of traction.

A) Fuel and its combustion.

a) Choice of fuel : coal, mixing of coals, peat, oil fuel, pulverised fuel, mixing of solid and liquid fuels (colloidal fuel) ;

b) Apparatus for the combustion of solid fuel (rocking-grates, etc.) liquid and pulverised fuels;

c) Mechanical stokers;

d) Smoke consumption. Spark arresters.

Preliminary documents.

1st report (America), by Mr. G. H. EMERSON. (See English edition of the *Bulletin*, November 1924, p. 1029, or separate issue [with red cover] No. 8.)

2nd report (British Empire), by Mr. C. B. COLLETT. (See English edition of the *Bulletin*, March 1925, p. 797, or separate issue [with red cover] No. 29.)

3rd report (other countries), by Mr. H. CHENU. (See English edition of the *Bulletin*, May 1925 [2nd part], p. 1783, or separate issue [with red cover] No. 45.)

Special reporter : Mr. G. H. EMERSON. (See English edition of the *Bulletin*, June 1925, p. 2104.)

Report of the 2nd section.

(See *Daily Journal of the session*, No. 3, p. 6, and No. 5, pp. 5 and 6.)

Mr. MINSART, *principal secretary*, read Mr. Emerson's special report, in French.

Mr. BULLEID, *secretary*, read Mr. Emerson's special report, in English.

Mr. CHENU (*reporter*) renewed his report giving only the principal points.

He divided the railway systems into two categories as regards the conditions relating to coal :

1) those which select certain collieries;

2) those which specify special conditions (ash content, volatile matter, amount of moisture, fusibility of ash, etc.), other conditions being the percentage of sulphur, friability, etc. He pointed out the importance of each of these factors, and explained the organisation of the receiving services, and in addition insisted on the necessity of making tests on stationary boilers and running locomotives.

He afterwards dealt with fixing contract prices and the methods in use for mixing the various kinds of coal.

The fuel consumption of the various railways cannot be compared owing to the

statistics being prepared in different ways.

Mr. CHENU suggested that standard statistics of fuel consumption based on calories per virtual ton-kilometre be adopted.

Mr. Chenu referred also to grates, the shape of fire-boxes, liquid and pulverised fuel, spark arresters and mechanical stokers.

Mr. LACOIN (*Paris-Orleans Railway*) asked if the railways had not tried rational statistics.

Mr. DINIZ (*Portuguese Railway Company*) pointed out that the Portuguese railways calculate the bonuses for drivers by means of the virtual ton-kilometre formula given by Mr. Mauduit in his report (1). He found coefficients varying from 1.2 (flat countries) to 1.4 and 1.6 (hilly countries).

Mr. BIANCHI (*Italian State Railways*) said that the Italians also used the virtual ton-kilometre to calculate the bonus paid to drivers and found the coefficients to be about 1.35. The formula used took into account gradients and curves, but not speed.

Sir Henry FOWLER (*London Midland & Scottish Railway*) stated that the question had already been discussed at the 1922 Congress. He hoped that the companies would make it a subject of study.

Mr. PAWLOWSKI (*Polish State Railways*) said that the Polish railways were also studying the question.

Mr. CANTUNIAR (*Roumanian State Railways*) pointed out that the Roumanian railways used liquid fuel at the same time as lignite, because by doing so the temperature in the firebox is less variable. Oil and lignite are burned in the proportion of 2 to 1, the burners being fixed preferably at the back with return flame.

Burners for external pulverisation are the most efficient and make no noise.

Burners for internal pulverisation use less steam, but give a flame which does not burn so well and is very noisy.

Burners should be invented the flame of which could be adjusted.

Firing with oil costs less in Roumania than with solid fuel.

Mr. NOBILI (*Italian State Railways*) said that after three years experience they found the best results from the point of view of efficiency were obtained with liquid fuel. Also for the sake of efficiency it is better to place the burners at the back of the firebox.

Mr. CANTUNIAR. — From the point of view of efficiency, the use of liquid fuel alone is preferable, but not as far as the preservation of the firebox is concerned.

Mr. NOBILI. — In order to avoid large variations of temperature, as many as five burners have been fixed which can be lighted together or according to requirements.

Mr. PAWLOWSKI asked whether rocking grates or drop grates were best for getting rid of clinker.

Col. COLLINS (*South African Railways*) stated that all locomotives on his system were fitted with drop grates, which had given satisfaction, as their coals had a high ash content.

Mr. HEAD (*Ceylon Government Railways*) stated that they had a number of locomotives fitted with both systems, but prefer the drop grate.

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(1) Report presented to the French Government in the name of the Commission appointed to study the electrification of railways.

THE PRESIDENT called attention to the fact that the efficiency of smoke consuming devices depended largely on the engine staff. He had noticed that in England locomotives produced very little smoke, though these had no smoke consuming apparatus. A good many locomotives in Switzerland had been fitted, but it was noticed that when they were driven carelessly, they produced a lot of smoke.

THE PRESIDENT asked if the United States delegates would speak on the use of mechanical stokers.

Mr. CRAWFORD (*United States Government*) gave particulars relating to mechanical stokers. Trials commenced in 1912 and extended to 1914. In 1918, 8 000 locomotives were equipped, and at the present time 15 % of the locomotives are fitted with mechanical stokers. Of those locomotives with a tractive effort of or above 60 000 lb., 90 % are fitted. They have even been fixed on locomotives having a grate area of 45 square feet, but of course more generally on the larger sized engines.

Mechanical stokers are found to give a higher temperature and obviate the necessity of employing a second fireman. Trains can be worked over several divisions without cleaning the fires, and their loading may be increased from 10 to 15 %. The diameter of the blast pipe can also be increased.

Mechanical stokers have also been fitted to less powerful engines in those regions where the hot climate makes hand firing particularly irksome.

Mr. LACOIN asked what economy might be expected by the use of a mechanical stoker fitted on an engine which could be worked with only one fireman.

Mr. CRAWFORD replied that the use of a mechanical stoker prevented losses of heat and fuel on account of the firehole door being always closed and so allowed a more regular working.

Sir Henry FOWLER asked what was the effect produced on superheat and on the production of smoke.

Mr. GRESLEY (*London & North Eastern Railway*) asked what were the maximum pounds of coal per hour that could be hand fired.

Mr. CRAWFORD replied that superheat was increased and smoke reduced, but he had no figures. The maximum rate of hand firing was 7 000 lb. per hour, but the average may fall to 4 000 and even 3 000 lb. per hour. Mechanical stokers reduce smoke on account of the better distribution of coal.

THE PRESIDENT asked Mr. Chenu, *reporter*, to read the summary which he had prepared on this question.

A discussion arose on the proposed text, especially as regards establishing statistics to furnish the virtual ton-kilometre, the use of rocking bars, mechanical stokers and spark arresters.

Sir Henry FOWLER would like to see the wish recorded that statistics should be established giving the virtual ton-kilometre.

Mr. LACOIN thought that these statistics are unnecessary and all that is required would be a recommendation that a formula giving the virtual ton-kilometre should be thought out stating to what extent it would help tabulating standardised statistics.

Mr. NOBILI considered that there was no doubt as regards the question.

Mr. GRESLEY pointed out that rocking grates were not in use in England.

Sir Henry Fowler agreed with these remarks and proposed that the text should be altered accordingly.

Mr. Vallantin (*Paris-Lyons-Mediterranean Railway*) said we are abolishing rocking grates on our lines, finding that they cause a greater expense in coal and in upkeep.

Sir Henry Fowler pointed out that there was a certain amount of disagreement between the different railway companies.

Mr. Elliott (*South African Railways*) explained that it all depends on the quality of the coal.

On the suggestion of the President, the section decided to come to no definite conclusion as regards rocking grates.

Mr. Duchatel (*Eastern Railway, France*) did not agree that the use of mechanical stokers increases superheat.

The reporter pointed out that they obviate opening the firehole doors.

Mr. Vallantin and Mr. Bachellery (*Midi Railway, France*) proposed not to give the figure of the consumption of fuel at which mechanical stokers could be used advantageously.

Mr. Haynes (*Canadian National Railways*) called attention to the importance of opening the doors in such countries like Canada.

Mr. Gresley thought that the text was too affirmative as regards the advantages of mechanical stokers over manual firing, and stated that the experience of his railway with regard to spark arresters did not confirm their efficiency.

Sir Henry Fowler said that in addition their use was subject to various inconveniences.

Col. Collins was strongly of opinion that these devices were efficient against the danger of fire.

Sir Henry Fowler, in view of the unanimous opinion of the English engineers, suggested another wording.

Mr. Rivet (*French Government*) said that their efficiency may be subject to differences of opinion, but it was desirable that locomotives should be fitted with spark arresters.

Mr. Politis (*Greek Government*) pointed out the interest administrations should take in the question as regards Insurance Companies.

After discussion, the section adopted the modified summary as follows :

Final summary.

« *Choice of fuel. Coals. Mixing of coals.*

« The choice of fuels is based essen-
« tially on the source of supply at the
« disposal of the railways. The type of
« fuel chosen by the railways, before
« ordering, should specify and, on deli-
« very, verify the characteristics of the
« fuel which should give the maximum
« amount of efficiency in the boilers
« under the conditions they are working.

« The statistics of coal consumption as
« carried out at the present time do not
« allow comparison between the various
« administrations.

« Standard statistics would be of great
« advantage for all railways. Such sta-
« tistics cannot be prepared at once, but
« a step towards them would be taken if
« the coal consumption was based on the
« virtual ton-kilometer.

« The difficulty concerning solid fuel « which one frequently meets is to get « supplies, whose characteristics, once « determined, have a constant value; the « necessity or the advantage which may « result from the purchase of different « coals; and, finally, the irregularity of « supplies of different coals necessitate, « the mixing of coal scientifically and « thoroughly. To this effect it seems to « be wise to use mechanical means of « mixing coal, which are provided either « at the running shed or at different « points of the system where central « mixing yards are installed.

« *Liquid fuel.*

« Liquid fuel is used when the cost of « the caloric taken into account when the « purchase price and the calorific value « is of about the same value as in the case « of solid fuel. It is therefore only used « by those lines which are near to the oil « fields and far from the coal fields or « where the solid fuel is of inferior qua- « lity.

« When the cost of oil fuel is such that « it can be used, its use has many advant- « ages, the chief being :

« *a*) Reduction of quantity of fuel « used when standing;

« *b*) Increase of power of the locomo- « tive;

« *c*) Less work for the fireman;

« *d*) Easily regulated firing on hilly « sections;

« *e*) More easily operated;

« *f*) Better control of smoke.

« *Pulverised and colloïdal fuel.*

« These fuels have not got beyond the « experimental stage.

« *Equipment for burning fuels.*

« *Mechanical stokers.*

« When the quantity of coal is such « that it is difficult to fire it by hand, « there are advantages in mechanical « firing, which also does away with the « necessity for opening the firehole door.

« *Smoke consuming devices.*

« The efficiency of these devices and « the economy that they give are not de- « finitely known; on many railways the « tendency appears to be to remove them.

« *Spark arresters.*

« Spark arresters are generally con- « structed of grids and perforated plates, « wire mesh or expanded metal. »

— The General Meeting ratified this final summary at the meeting held on 27 June.

QUESTION IV-B.

Reduction of the cost of traction.

B) Lubrication of axleboxes for all rolling stock.

a) Axleboxes. Plain bearings. Roller and ball bearings;

b) Lubricants.

Preliminary documents.

1st report (America), by Mr. G. H. EMERSON. (See English edition of the *Bulletin*, November 1924, p. 1055, or separate issue [with red cover] No. 9.)

2nd report (all countries, except America and the British Empire), by Mr. TÊTE. (See English edition of the *Bulletin*,

April 1925, p. 859, or separate issue [with red cover] No. 30.)

3rd report (British Empire), by Sir Henry Fowler. (See English edition of the *Bulletin*, February 1925, p. 313, or separate issue [with red cover] No. 18.)

Special reporter : Sir Henry Fowler. (See English edition of the *Bulletin*, June 1925, p. 2107.)

Report of the 2nd section.

(See *Daily Journal of the session*, Nos. 3, p. 7, 5, p. 6 and 6, p. 3.)

Sir Henry Fowler (*special reporter*) read the summary of the three reports which had been prepared on this question.

Mr. Minsart (*principal secretary*) read the summary in French.

M. Tête (*reporter*) drew attention to the importance of overcoming loss of oil from the back of the box, and mentioned, in this connection, the use of woollen pads to prevent oil being thrown against the dust shield. Mr. Tête also mentioned the method of « running in » bearing brasses on the journal, as done on the Belgian State Railways, which almost completely overcame liability to hot boxes.

Mr. Van Schouwenburg (*Netherland Indian Railways*). — In India oil pads have been used and laterly packing. This has been adopted to prevent the loss of oil and has proved satisfactory.

Mr. Forte (*Italian State Railways*) said that in Italy they had attempted to make it unnecessary for the driver to attend to axlebox lubrication. A periodical lubrication has been adopted for axleboxes, being once per month for engine axleboxes and every six months for tender axleboxes.

For packing they used a mixture of horse-hair and wool in equal parts.

Mr. Maunsell (*Southern Railway, Great Britain*) drew attention to the way in which the heat produced by friction is conducted away, and mentioned the advisability of machining the portion of the box which came into contact with the brass. Tests made on boxes which have been machined and in boxes which have not been machined showed a difference of temperature of 30° F.

The President asked for some information on mechanical lubrication, and especially on the « isothermos » type of box.

Mr. Lancrenon (*Northern Railways, France*). — The Northern has made tests with boxes of the « isothermos » type on coaches, wagons and tenders of express trains. The economy of oil is considerable, while hot boxes have decreased. Coaching stock used on express trains is inspected every month and require 100 gr. (3.5 oz.) of oil per axlebox at each inspection. On the tenders the need for lubrication by the driver has been entirely done away with. It is absolutely necessary that the dust shield should be a proper fit.

Mr. Poncet (*Eastern Railway, France*). — Up to the present boxes of the « isothermos » type have only been used for outside bearings, but the firm are investigating for the Eastern Railway Company the application of these boxes to inside bearings of bogies on engines of the Pacific type.

The President. — Have any tests been made with these axleboxes to determine the resistance?

Mr. Lancrenon. — No tests have been

made, but it may be stated that the oil consumption is proportional to the speed.

THE PRESIDENT. — Have any results been obtained for freight wagons?

Mr. LANCRENON. — Wagons fitted with these axleboxes were in service during the whole of the war.

THE PRESIDENT asked for information on roller bearing boxes.

Mr. LACOIN (*Paris-Orleans Railway*) had carried out tests with a suburban train composed half of ordinary stock and half of stock fitted with roller bearings. It was found that there was a reduction of 7 to 8 % in the tractive effort required at a speed of from 40 to 50 miles per hour. These axleboxes did not show any advantage when starting, but were rather suitable for fast goods trains, for example, parcels trains.

Mr. AHLBERG (*Bergslagen Railway, Sweden*). — Roller bearing boxes gave good results but are costly; up to the present they have not led to any economy.

Mr. REID (*London Midland & Scottish Railway*) has carried out tests with roller bearing axleboxes, but did not find any advantage except when starting.

He did not think that the machining of the box was an important matter, nor did he attach great importance to the burnishing of the journal. Ground journals gave the best results. One could reduce the amount of oil used without getting hot boxes by controlling the amount used. The oil pad required a more fluid oil than the cotton waste packing. He had obtained good results with a lead base white metal. Tin was only necessary for axles used on express trains carrying heavy loads.

Mr. GRESLEY (*London & North Eastern Railway*). — The greatest difficulty as regards mechanical lubrication lies in the flexible pipe between the lubricator and the axlebox.

He asked for information on grease lubrication which is used in America, but which in this country has led to a number of hot boxes.

He agreed with Mr. Reid that it was not necessary to machine the inside of the boxes.

Oil pads kept the bearing cooler than does packing.

The brasses should be well tinned so that the white metal adheres firmly.

He did not agree with Sir Henry Fowler as regards the use of a lead base white metal for bearings of coaching stock and wagons.

Great care should be taken in attempting to re-utilise recovered oil for coaching stock axleboxes.

Mr. WALLIS (*Pennsylvania Railroad*). — In America the use of grease for the axleboxes of coupled wheels is almost universal. I do not think there are more than 2 % of the locomotives in America in which oil is used.

Mr. LACOIN. — The composition of the white metal for bearings gives rise to the question of the saving which may be effected by recovery and re-utilisation. With tin base alloys, 90 % can be recovered. I am not sure therefore that the use of a lead base alloy for wagon axleboxes is the most economical.

As regards the dimensions of axlebox bearings, Mr. GRESLEY proposed to recommend the use of short bearings, as his experience had showed him that long bearings gave rise to hot boxes at high speeds.

Sir Henry Fowler and the President said that their experience led to the opposite conclusion. It is necessary to keep the pressure per square inch down to certain limits.

Mr. Bianchi (*Italian State Railways*). — In Italy, not only the pressure per unit of area is taken into account, but rather the energy, dissipated in friction, that is to say, the dimensions of the bearings are based on two factors : pressure and speed. The rolling stock is divided into four categories in accordance with the speed.

Mr. Duchatel (*Eastern Railway, France*) proposed that the text should take these remarks into account, and Messrs. Lacoin and Wallis asked that the question of speed should be mentioned.

After a discussion between Messrs. Bianchi, Gresley and Sir Henry Fowler, the President undertook to amend the wording of the text on this point.

As regards the use of white metal for coaching stock and wagons, Sir Henry Fowler proposed a text which should mention the American practice, which is to use a lead base alloy.

Col. Collins (*South African Railways*). — White metal used for coaching stock and wagons may be scrap metal from locomotive axleboxes (tinned base); one should not therefore recommend the use of a lead base alloy.

Sir Henry Fowler stated that the question had been discussed in England, and that at the present time on his railway two mixtures were used according to circumstances, one having 85 % of tin and the other 75 % of lead.

Mr. Gresley was supported by the general opinion of the section in proposing to delete the recommendation to use a lead base alloy.

As regards roller bearing axleboxes, Mr. Lacoin gave some further information. At the moment of starting there is a reduction in the necessary tractive effort, but in taking into consideration the average tractive effort, it was found that greater economy was realised with trains running at about 25 miles per hour than with trains making frequent stops.

Sir Henry Fowler. Tests made in England have shown us that there is only a decrease in the necessary tractive effort when starting.

The wording of the text on this matter was left for consideration, and clauses 8, 9 and 10 were adopted without any remarks.

The clauses of which the wording was to be reconsidered having been discussed and re-worded by the delegates who had taken part in the discussions, the section finally adopted the following text, after Mr. Elliott (*South African Railways*) had said with reference to clause 5 that the composition of the various white metals had not been given, and that this question should be discussed at a coming session.

This suggestion will be recommended to the Permanent Commission.

Final summary.

« *Axleboxes : Locomotives.*

« 1. — Cast steel is the most widely « used material for engine axle boxes. « The use of non-ferrous alloys by a few « administrations may be referred to.

« 2. — Dust shields should be fitted « whenever possible.

« 3. — It is advisable to keep down the « bearing pressure as far as possible in « order to reduce wear and avoid hot « bearings. It would seem that a close « study of this point would be useful, « although in some cases it is governed « by factors of design not pertinent to « this question.

« 4. — The most suitable class of « white metal depends upon the condi- « tions under which it is used. Generally « speaking a tin-base alloy is more suit- « able when an alternating or hammering « action has to be sustained, but a lead « base can be used for other cases.

« 5. — Mechanical lubrication, though « still in an experimental stage on the « majority of administrations which have « adopted it, is giving encouraging re- « sults, and its application is extending.

« 6. — No administration reports the « fitting of ball or roller bearings to axle- « boxes of coupled wheels.

« 7. — Mineral oil is almost universal- « ly used, a certain number of adminis- « trations adding a small proportion of « animal or vegetable oil. In America « grease lubrication is general for « coupled axleboxes.

« *Axleboxes : Coaching and wagon stock.*

« 1. — Cast steel appears to be the best « material for modern high-capacity « stock, especially where subjected to « rough usage.

« 2. — The open-fronted or « one- « piece » body type of axlebox is the « most widely used.

« 3. — Careful attention should be « given to guard against loss of oil from, « or rain water entering the axlebox. « Dust shields in some cases appear ca- « pable of improvement.

« 4. — With bearings for carriages « and wagons, it is desirable to consider « in the design, the width of and pressure « on the bearing, and the speed at which « the vehicle runs.

« 5. — White metals with a tin base « are largely used in Europe and the « British Empire. In America a lead « base is universally employed.

« 6. — Oil lubrication is universal for « up-to-date stock. Practice is divided « between the use of pads and packing. « Either method appears satisfactory if « proper attention is given to design and « maintenance.

« 7. — Several administrations have « experimented with roller and ball « bearings. It has been found that there « is considerable reduction in starting « effort, but the results obtained for the « tractive effort required at speed are not « in agreement. The first cost of fitting « up these bearings is high. The trials « have not been carried out for a suffi- « cient length of time to allow of a defi- « nite statement being made as to the cost « of maintenance.

« 8. — Majority of administrations use « mineral oil without any addition of « animal or vegetable oil.

« 9. — It is fairly general practice to « recover and refine waste oil recovered « from axleboxes or from discarded « packing or pads.

« 10. — It is very desirable, especially « as regards wagon stock, that standardis- « ed types of axleboxes be adopted so as « to reduce the necessary stock of spares, « and in order that the examining and « repair staff may become accustomed to « the design and carry out their work « more expeditiously. »

— The General Meeting ratified this

final summary in the meeting held on the 27 June.

QUESTION V.

High speed electric locomotives.

Preliminary documents.

1st report (America), by Mr. J. T. Wallis. (See English edition of the *Bulletin*, January 1925, p. 179, or separate issue [with red cover] No. 15.)

2nd report (other countries), by Mr. M. Weiss. (See English edition of the *Bulletin*, April 1925, p. 1019, or separate issue [with red cover] No. 33.)

Special reporter : Mr. M. Weiss. (See English edition of the *Bulletin*, June 1925, p. 2111.)

Report of the 2nd section.

(See *Daily Journal of the session*, No. 6, p. 2, and No. 7, p. 3.)

Mr. Lacoin, *vice-president*, occupied the chair.

Mr. Weiss (*special reporter*) read the special report of which he was author.

The President read the nine items which the special reporter proposed for discussion, and pointed out that the five first are interwoven and might be discussed together.

Mr. Wallis (*reporter*) said that if the questions raised by the special reporter were satisfactorily answered, all the information wanted in the United States would have been given.

Discussion on item 1.

The discussion referred more particularly to the difficulties of commutation and the stability of bogies (means for the prevention of oscillation).

Mr. Bachellery (*Midi Railway, France*) pointed out that his Company ran locomotives with the « tram » type of motor suspended by the « nose ». After a speed of 50 miles an hour, however, difficulties were experienced with vibration due to sparking of the brushes.

Oscillation was also noticed which was successfully overcome by fitting the bogies with a lateral buffer arrangement without springs, thus allowing a vertical motion which opposed the lateral movements.

For speeds above 60 miles per hour the « tram » type of motor has been superseded in favour of rigid frames and guiding bogie.

Mr. Leboucher (*Midi Railway, France*) attributed the difficulties in commutation to the inertia of the brushes. Satisfactory results have been obtained in dividing the brushes into two and making use of very wide ones.

Mr. Bianchi (*Italian State Railways*) said that locomotives with two bogies of the class C + C with rigid spherical coupling of the two bogies had been tried up to 68 miles per hour without causing any trouble whatever.

Mr. Wallis (*reporter*) pointed out that trouble had also been experienced with the behaviour of the brushes on motor driven coaches.

The President asked if it could be stated up to what speed it would be safe to run with separate bogies (types B + B or C + C), and what would be the best method of connecting the bogies together.

Mr. Weiss (*special reporter*) said that with locomotives running at about

47 miles per hour great wear on the tyres was found to occur when the curves were sharp (650 feet radius). This has been remedied by means of a transverse coupling allowing the front bogie to guide the rear one.

Mr. BACHELLERY attributed the wear on tyres to curves of short radius, and pointed out the necessity of overcoming oscillation, which occurred also on straight roads when running fast.

Mr. JAPIOT (*Paris-Lyons-Mediterranean Railway*) pointed out the advantage of having a restoring device between the coach body and the bogies, a system in use, he thought, in America.

Mr. LEBOUCHER described a method of restraint between the two bogies arranged on the principle of two specially formed buffers, the distance between which widened on curves.

Discussion on item 2.

Mr. WALLIS agreed with the special reporter as to the remark he made with regard to item No. 6 of his résumé (breakages of springs when the concentricity of the quill drive and the axle is not maintained in actual service).

Discussion on item 3.

Mr. PARODI (*Paris-Orleans Railway*) said that the Paris-Orleans Railway, with a view to comparing the different systems, had ordered locomotives fitted with hyperstatic rods and others with an isostatic transmission, with springs between the motor and the shaft.

Mr. BIANCHI said that in Italy all electric locomotives were fitted with rigid rods. With three phase it is not possible to place the springs between the motor and the shaft. There was no adjusting of the rods, their length being carefully fixed in the workshop with a play of 2/10 mm. (1/128 inch).

Mr. WALLIS said that in the United States also the advisability of placing the springs between the motors and the axles was agreed as the best practice.

Discussion on item 4.

Mr. WEISS pointed out that in Switzerland only oil was used for the lubrication of the gearing, and said it was very necessary to look after the tightness of the gear cases.

Mr. BACHELLERY called attention to the method of construction which consisted in fixing the rim of the gearing on a centre forming part of the wheel, and to the use of double gearing (one set at each side) instead of only one.

Lubrication with grease removes any anxiety that might arise concerning the tightness of the gear cases.

Mr. WALLIS said that gearing fixed to the wheel was also used in the United States.

Mr. LEBOUCHER referred to lubrication by means of a pump used on the 2 + C — C + 2 locomotives fitted with vertical motors on the French Midi Company.

Messrs. PARODI and WALLIS made some additional remarks on the lubrication of motors by means of oil pumps, and gearings which are lubricated with grease.

Discussion on item 5.

Mr. WEISS asked if it was necessary to

reduce the loading per axle when there is no carrying axle in front.

Mr. Bachellery replied that as regards this point no difference between electric and steam locomotives had been noticed, though it would seem at first sight that the former might be allowed heavier loads than the latter, on account of the absence of all variation due to the parts having a reciprocating motion. It was found by experience with locomotives that the guiding bogie should be adopted for speeds exceeding 56 miles per hour.

Mr. Parodi pointed out that the Orleans Company had for experimental purposes designed arrangements allowing the method of restraint in both back and front bogies to be regulated according to requirements, and even to change the bogies into a type of Bissel truck.

A discussion then took place between Messrs. Wallis, Japiot and Bachellery on the subject of running symmetrically arranged locomotives. Mr. Wallis said that it was at present acknowledged in the United States that these locomotives ran perfectly, and added that if the Bissel truck was preferred to the bogie, it was only because length was reduced by this means.

Mr. Weiss pointed out that the asymmetrical arrangement found on certain Swiss locomotives was wholly justified by the necessity of equalising the weight of the motors.

Mr. Leboucher added that there were good reasons for placing the point of application of the restoring force of the bogie on the carriage as low as possible.

The President then proposed a summary to be submitted later on for agreement by the section.

Discussion on item 9.

The comparison of annual mileage of electric and steam locomotives gave rise to a discussion in which several members took part. It was pointed out that higher figures were given for electric locomotives (sometimes double), but the circumstances in which the locomotives are running should be taken into account. This subject will be referred to later on.

— The discussion will be continued at the next meeting.

Continuation of the discussion with Mr. Weiss (*special reporter* and *president*) in the chair.

Discussion on item 6.

At item 6, Mr. Steiner (*Swiss Federal Railways*) referring to the use of oil for insulation in commutators and transformers, remarked that insulation could be obtained by means of air.

Mr. Bianchi said that in Italy it had been found that oil was dangerous to use, and that oil switches were no longer fitted to locomotives of great power.

Mr. Wallis remarked that the Americans had not yet decided which was best for insulation — air or oil, though oil-cooled transformers are also used without hesitation. Mr. Weiss, however, stated that the Swiss Federal Railways had no complaints to make against oil switches. In Germany at the present time air-cooled transformers were being tried, and the first used in Switzerland were of this kind.

Discussion on item 7.

Several members who took part, more particularly Messrs. Bianchi, Wallis.

LEBOUCHER, STEINER and PARODI, spoke favourably of the electro-pneumatic system of remote control.

Discussion on item 8.

Mr. BIANCHI pointed out that with three phase it was necessary to take care of the bearings, the air gap being very small, but well constructed windings might remain in service for several years without needing repairs.

Mr. WALLIS compared the single phase motors with continuous current ones from the repairing point of view. On motor coaches the first kind are more costly in repairs.

Mr. STEINER said that the upkeep of single phase motors was not more expensive than others. There was nothing requiring particular care except the turning of the commutators.

Mr. PARODI, with whom several members agreed, pointed out that the motors made now are not so well made as those of 20 years ago.

Renewal of the discussion on item 9.

The comparison between the mileage of electric and steam locomotives and the mileage between shoppings raised a new discussion between several members, from which it was gathered that the general opinion was that electric locomotives make the greater mileage, but with the figures given no exact comparison could be made, either because the locomotives ran on different services, or on account of mixed haulage. Certain electric locomotives also required repairs due to the novelty of the system, which would be better understood in time.

The question of running locomotives by one man or two was then discussed, and from the information given it appeared that some were running fitted with the « dead man » apparatus which automatically puts the brakes on the locomotive when the driver has to release the controller handle for a short time.

As a rule, however, locomotives are run by two men, and motor coaches by one man only.

The discussion was then postponed for a time.

On renewal of the discussion with Mr. WEISS in the chair, the latter read out the summary agreed to by the reporters based on the discussion which had taken place, the final text of which is given at the end of this report.

To item 1, Mr. LACOIN and Messrs. JAPIOT and BACHELLERY suggested alterations in the text regarding fixing the loading per axle. It was decided to give no definite figure for loading per axle that should be considered authoritative.

As regards item 2, Mr. BACHELLERY suggested that the designation of « transmission by quill drive » should be used instead of using the name of a firm.

After remarks from several members on the question of maintaining the concentricity of the quill and the driving axle, and the influence of the number of axles on the maintenance of this concentricity, the section adopted a modified text.

Items 3, 4, 5, 6 and 7 were agreed to without discussion with the exception of a remark by Mr. TCHEOU WEÏ (*Chinese State Railways*), who thought it would be better to omit the words « at very high speed ».

Items 8 and 9 were agreed to without discussion.

A discussion took place on item 10 relative to the running of locomotives with one man only. Nothing, however, could be definitely stated with regard to this question, and on the suggestion of Mr. Wallis it was decided to omit this item.

The President then read the final text of the summary as follows :

Final summary.

« 1. — The two systems of transmission, « tram type » and « gearless type » « can be used on high-speed locomotives « with satisfactory results.

« It has been found, however, desirable, « in view of the unsprung weight and the « relatively low centre of gravity, to limit « the axle weight on the rail to a reasonable figure.

« 2. — The « quill drive » can be and « is used on high-speed locomotives. « The quill and driving axle should be « kept as far as practicable concentric, « the difficulty of maintaining concentricity increasing as the number of « axles under one frame increases.

« 3. — In the case of high-speed locomotives with rod drive, it is as well to « incorporate shock absorbers in the « transmission. The fitting-up of the « rods should be carefully looked after « in all cases.

« 4. — Different types of gearing with « oil or grease lubrication are actually in « use on high-speed locomotives and give « generally satisfactory results.

« 5. — There is, so far, insufficient « experience to enable any recommendation to be made as between the rod or « direct drive for high-speed locomotives, « both types being in use at the present « time. Bissel trucks, or bogies, only « appear to be required on locomotives to « run at very high speeds.

« 6. — The use of oil switches and « transformers is general on high-speed « locomotives working on alternating « current and do not appear so far to « have given any particular trouble.

« 7. — Electro-pneumatic control appears to be the type which should give « the best results on electric locomotives.

« 8. — Electric traction by high-speed « locomotives has not been in use long « enough to form any conclusion as to the « comparative difference in cost of upkeep between the various types of « motors, but it appears that the difference will be small.

« 9. — High-speed steam and electric « locomotives are used in such different « ways on the principal railways that it « has not been possible to come to any « definite conclusion as to the relative « mileage such engines can run between « heavy repairs. So far both experience « and theoretical investigation indicate « that the electric locomotive will give « the better mileage. »

— The General Meeting ratified this final summary at the meeting held on the 1 July.

QUESTION VI.

Locomotive sheds.

Arrangement of locomotive sheds.

Installations :

a) for inspecting engines;

b) for washing out boilers and blowing through the tubes;

c) for lighting up of engines and getting rid of the smoke;

d) for loading fuel on the engines. Mixing fuels. Disposal of ashes;

e) for the recovery of coal and coke from the residues of combustion.

Preliminary documents.

1st report (British Empire), by Mr. R. E. L. MAUNSELL. (See English edition of the *Bulletin*, February 1925, p. 501, or separate issue [with red cover] No. 21.)

2nd report (all countries, except the British Empire and America), by Mr. G. FORTE. (See English edition of the *Bulletin*, May 1925 [1st part], p. 1561, or separate issue [with red cover] No. 39.)

3rd report (America), by Mr. R. W. BELL. (See English edition of the *Bulletin*, March 1925, p. 765, or separate issue [with red cover] No. 28.)

Special reporter : Mr. G. FORTE. (See English edition of the *Bulletin*, June 1925, p. 2115.)

Report of sections II and III combined.

(See *Daily Journal of the session*, No. 8, p. 2 and No. 9, p. 2.)

Mr. TRENCH announced that Mr. Weiss had requested him to take the chair for the discussion on question VI, and stated that the special reporter had not been able to arrange any definite summary, so that it would be necessary to examine the special report in order to see what could be done.

The question of building materials might be put on one side as it concerned only the constructional engineer and was of no interest to those who had to work the shed.

Mr. FORTE (*special reporter*) then read his special report.

THE PRESIDENT opened the discussion on the type of shed that is most suitable for general purposes.

Mr. R. W. BELL (*reporter*) said that in the United States they preferred the round shed with turntable, because it took up less space and made it easier for the entrance and departure of engines.

Mr. PAWLOWSKI (*Polish State Railways*). — Rectangular sheds are more difficult to keep warm than sector sheds from which engines may run out at any time without completely opening the premises.

Mr. FORTE asked why rectangular sheds in Belgium were used. It is quite an interesting question because the extension of electric traction make rectangular accommodation much more convenient.

Mr. CHENU (*Belgian State Railways*) pointed out the advantages of rectangular running sheds fitted with traversers and suitable shed roads.

THE PRESIDENT proposed that the text at the end of the report should be adopted.

This was followed by a discussion on special installations. The question of the recovery of oil and waste from dirty waste used for cleaning purposes was then discussed.

Questionned by the President, Mr. CHENU said that the installation at Schaerbeek was based essentially on centrifugal extractors and recovered waste was used several times over for cleaning locomotives.

Mr. FORTE gave particulars of the method followed in Italy, which consisted in contracting with a firm to do the necessary cleaning.

Sir Henry Fowler (*London Midland & Scottish Railway*) pointed out the utility in concentrating recovery installations instead of spreading them out into the various locomotive depots, and said that in England sponge cloths were generally used instead of cotton waste and that the oil was usually extracted with special apparatus.

Mr. R. W. Bell. — In the United States we have found no advantage in using cotton waste over again on account of the dirt it retains after its first use. Afterwards the only use it can be put to is to use it up for firing locomotives. However, I should be very glad if members could inform me of any means to cleanse it properly as some economy might result from the process.

Mr. Maunsell (*reporter*). — Sponge cloths are used to a great extent in England, and if they are of good quality, can be cleansed several times and in that case are much more economical than cotton waste.

The President resumed the discussion by saying that not only cotton waste, but also the oil was used over again, and suggested a wording which was agreed to.

Facilities for carrying out light repairs to locomotives in the shed need not enter into the discussion.

Installations for washing out and filling up locomotive boilers gave rise to a discussion between Messrs. Bell, Pawlowski, Forte, Poncet (*Eastern Railway, France*) and Sir Henry Fowler.

Mr. R. W. Bell. — In using hot water for washing out as well as for filling boilers, it should be limited to a temperature which would allow those concerned to handle the hose pipe and nozzle. Men cannot stand a temperature higher than 190° F. As for the plates, the limit depends on the temperature at which they may happen to be. We have sheds which send out 125 large engines in the course of 24 hours. This would not be possible without a hot water washing-out plant.

Mr. Pawlowski thought that the great advantage was in the saving of time and to the abstraction of salts by using hot water.

Messrs. Forte and Poncet thought that when a small running shed has to be dealt with and the staff has little to do, washing out with cold water is more economical. There are, however, hot water washing-out plants in Italy.

Sir Henry Fowler said that in emptying a boiler which was still hot avoids the deposit of salts during the cooling down.

Mr. R. W. Bell was of opinion that even with a specialised staff it was better to reduce as much as possible the time engines should be allowed to remain at the depot, and this applies equally to the number of washouts.

The President proposed a wording which was adopted.

Firing up of the boilers and devices for the reduction of smoke did not necessitate any special remarks.

The President remarked that the lighting of sheds depended on outside conditions and that the question of heating was more important, but this was not a subject for discussion.

Shed workshops. — A discussion arose on this question as to whether each running shed should repair its own

engines (except those requiring heavy repairs) or if it is better to send them to more important depots.

Mr. Chenu explained the advantages of the latter system, which is the practice in Belgium.

Mr. Renevey (*Alsace-Lorraine Railway*) gave the practice in Alsace-Lorraine, where this organisation has been done away with so that each depot might be responsible for the repairs to its own engines. The chief inconveniences of this system are the allocation of responsibilities and useless trips.

Messrs. Pawlowski, Forte and Lacoin (*Paris-Orleans Railway*) were equally in favour of repairing engines at the depot to which they belonged.

After discussion, the sections agreed to the text formulated below.

Mr. Weiss pointed out that as regards clause 2 it was not possible to apportion the exact percentage of repairing places, and this clause was agreed to with a slight alteration.

Clauses 3 and 4 were deleted on the suggestion of the President.

Clause 5 was agreed to with a slight alteration, after Mr. Forte had read a paper on the subject of oxy-acetylene welding of copper plates. Repairs to cracks in tube plates have been done by this method in Italy with very encouraging results.

Stores. — The President offered a suggestion which was agreed to by the section.

Coal stages. — Mr. Maunsell gave particulars as regards installations in use in England, and Mr. R. W. Bell made remarks from the American point of view.

Mr. Maunsell. — There are two kinds of mechanical coaling apparatus : that by belting and that by reversible buckets. Both methods give satisfactory results, but with soft coal the bucket system gives rise, on our railways, to much waste, as the coal becomes powdered and is lost or will not properly burn in the furnace.

Mr. R. W. Bell. — In America hand coaling was customary in small depots, but it was not possible to do without mechanical coaling in the large sheds, and the economy realised largely made up for any loss in coal that might occur in the method of coaling.

The President proposed a wording which was adopted.

The continuation of the discussion was postponed until the next meeting.

At the renewal of the discussion, the President read out the clauses already agreed to.

Sir Henry Fowler proposed to add to clause 5 the following addition : « the extent of the repairs to be carried out at the shed depends upon local conditions ».

— This proposal was adopted.

Mr. Renevey suggested that electric welding should be mentioned in addition to oxy-acetylene welding.

This suggestion was agreed to after some remarks by Mr. Forte, who gave preference to the oxy-acetylene process.

The President read the text of the special report relating to *stores* and suggested that the subject should not be referred to in the summary.

— This was agreed to.

The President then read an article

relative to « Mechanical coaling » and proposed the following wording : « the use of mechanical coaling is increasing at the larger sheds. Where soft coal is used there is a loss owing to breakage, but this is counterbalanced by the saving in the cost of labour ».

— This was adopted.

Buildings and accessory equipment. — The sections agreed to omit any reference to the drying of sand.

With regard to the removal and disposal of ashes, Mr. FORTE stated that great economies had been made in Italy by extraction of coke from the ashes, and Mr. R. W. BELL replying to the PRESIDENT, said that in America ashes were only removed by hand in the small depots. In large depots mechanical apparatus are in use, either in the form of a box which catches the ashes and which is pulled up on an inclined plane, or by means of a grab which picks up the ashes from the pit.

THE PRESIDENT proposed the following text : « The mechanical handling of ashes is recommended at the large depots » and this was agreed to.

As regards cleaning tubes, Mr. VALLANTIN (*Paris-Lyons-Mediterranean Railway*) gave an account of the trials made on the Paris-Lyons-Mediterranean with the « Kylala » apparatus, which obviates the necessity of sweeping the tubes.

Mr. VAN SCHOUWENBURG (*Dutch Indies Railways*) said that this apparatus had given no appreciable result on his railway. Mr. FORTE gave a description of a process being tried in Italy which consisted in injecting steam on to the tube plate by means of tubes fixed on the fire-box sides.

THE PRESIDENT proposed that this should not be referred to in the summary, and this proposition was agreed to.

As regards the clause on « Cleaning of locomotives » Mr. R. W. BELL said that in America a trial had been made with a jet of petroleum thrown on to the engine by means of compressed air followed by a hot water washing down and hand cleaning. He hesitated to recommend this method for fear of hot boxes, etc., and thought that hand cleaning alone was quite as cheap.

THE PRESIDENT proposed that no conclusion could be come to on this subject.

— This was agreed to.

As regards water supply, Mr. FORTE pointed out the good results obtained in Italy with water softening plants which are now very numerous, and Mr. RENEVEY agreed with this statement. The PRESIDENT proposed the following wording : « The use of water-softening plants is increasing in all countries dealt with in the reports, and good results have been obtained. »

— This was agreed to.

Clauses 6, 7, 8 and 9 (« Turning of locomotives », « Accommodation for the staff », « Offices », « Heating and lighting apparatus ») need not be discussed, so it has been decided not to take these questions into consideration.

Sheds for electric locomotives.

The special report on this question was then read, and the PRESIDENT said that the subject was too vast to be included in a single paragraph, but would necessitate a comprehensive report all to itself.

His opinion was that the question referred only to steam locomotive sheds.

Mr. Van Schouwenburg remarked that the question of welding by electric and oxy-acetylene processes was very important and might be dealt with at the next Congress.

The following summary was adopted :

Final summary.

« 1. *Type of engine shed.* — Each type « of shed has its advantages, and the type « chosen is determined by local conditions and the views of the railway concerned.

« 2. *Pits.* — In some sheds all roads « are provided with pits.

« 3. *Recovery of oil and waste from « waste used for cleaning purposes.* — « In certain circumstances it has been « found advantageous to put down plant « for the recovery of oil and waste from « dirty waste.

« 4. *Arrangements for washing out and « refilling boilers.* — The use of hot « water for washing out and refilling « boilers can be recommended when « engines have to be kept at the shed for « the shortest possible time.

« 5. *Shed workshop.* — Generally « speaking, running sheds carry out all « repairs to their locomotives other than « heavy repairs, and maintain them in « good order. The extent of the repairs « to be carried out at the shed depends « upon local conditions.

« The repair shop should be able to « contain a reasonable proportion of the « engines stationed at the running shed, « and sufficient pits should be provided « for this number; some would be used « for inspection or changing wheels and « axles.

« Compressed air and oxy-acetylene « welding are of great use at a locomotive shed.

« 6. *Stores.* — Proper provision should « be made at each locomotive shed of the « following materials :

« *a*) Tools or equipment for temporary « issue or as a reserve stock;

« *b*) Spare parts or material;

« *c*) Oils;

« *d*) Various consumable stores for « use on locomotives and by the staff;

« 7. *Coal stage.* — The use of mechanical coaling is increasing at the larger « sheds. Where soft coal is used there « is a loss owing to breakage, but this is « counterbalanced by the saving in cost « of labour.

« 8. The mechanical handling of ashes « is recommended at the large sheds.

« 9. The use of water-softening plants « is increasing in all countries dealt with « in the reports, and good results have « been obtained. »

— The General Meeting ratified this final summary at the meeting held on the 1 July.

SECTION III.

Working.

President : E. du Castel.

Vice-presidents : H. Breaud, M. F. Keogh, J. Milne and J. W. Roberts.

Principal secretary : J. Van Rijn.

QUESTION VII.

Dispatching or control systems.

Preliminary documents.

1st report (all countries, except America and the British Empire), by Mr. E. Epinay. (See English edition of the *Bulletin*, March 1925, p. 619, or separate issue [with red cover] No. 24.)

2nd report (British Empire), by Mr. J. H. Follows. (See English edition of the *Bulletin*, February 1925, p. 389, or separate issue [with red cover] No. 19.)

3rd report (America), by Mr. F. P. Patenall. (See English edition of the *Bulletin*, April 1925, p. 1085, or separate issue [with red cover] No. 34.)

Special reporter : Mr. E. Epinay. (See English edition of the *Bulletin*, June 1925, p. 2124.)

Report of the 3rd section.

(See *Daily Journal of the session*, No. 8, p. 3 and No. 9, p. 4.)

The President pointed out the importance of the question, which is one which concerns almost all railways, and called upon the special reporter, Mr. Epinay.

Mr. Epinay stated that he had discussed with Mr. Follows, the British reporter, the question as to whether there was any difference between the terms « Dispatching system » and « Control system » as used in France and in England. They both considered that the terms were equivalent.

Mr. Epinay read a résumé of his special report. This report is reproduced in the June 1925 *Bulletin of the Congress* (p. 2124 et seq.).

The President then opened the general discussion.

Mr. Jorissen (*Netherlands State Railways*) considered that it would have been preferable to give the question the following heading : « Control and regulation of train-running. » As a matter of fact, other systems of control exist besides those applying in England, France, Belgium and America. In Germany and Switzerland control is carried out for the most part in the stations. The speaker was tempted to believe that the presence of a dispatcher was inclined to suppress all initiative on the part of stationmasters of large stations. In his opinion, if the staff of these stations was sufficiently capable a dispatcher would not be necessary; he thought that on the Continent the establishment of the dispatching system was chiefly the result of special circumstances which had arisen during

the war, when a particularly dense traffic had to be dealt with, and of circumstances after the war when a staff had to be used which had not always the desired capability.

Mr. Epinay himself had recognised that difficulties arose from the fact that the controller could not always follow exactly the situation in the large stations, and that the dispatcher, who was often of lower grade than the stationmasters of large stations, could scarcely give orders to the latter officials.

In America, also, there was recognition of the inconveniences arising from the fact that the dispatcher was not always kept exactly informed by the operators, who were « blind » officials.

On the Netherlands State Railways the train-running staffs at stations were recruited from among the more intelligent of the qualified employees : their grade varied according to the size of the stations; they saw exactly what was happening at the more important points, and one could safely entrust to these station dispatchers the passing on to more distant stations of the crossing and overtaking of trains.

As regards extraordinary seasonal traffic, the speaker considered it preferable to run auxiliary trains, whose journeys were fixed in advance, rather than special trains, whose running was planned by the dispatcher.

He considered that if on certain European railways stations were in a position, with the aid of train diagrams, to plan special train journeys themselves, the need for centralisation of the service would be felt to a lesser degree.

Mr. Lamalle (*Belgian State Railways*) was in accord that a dispatcher is perhaps not necessary in Holland, where there is a network of navigable canals; but he pointed out that if the dispatching system had not been introduced into Belgium it would at the present time have been impossible to deal with traffic under suitable conditions. The dispatching system in Belgium was not a product of the war; before the war the German system, which it was proposed to copy, had been studied, but the difference between the procedure adopted after the war in France and the German system was such that there was no hesitation as to which solution should be adopted. The German dispatcher only operates intermittently and draws up no diagram of the actual running of trains; in Mr. Lamalle's opinion, this diagram is essential. Experience has demonstrated that there is nothing to fear as regards the spirit of initiative in stationmasters; the dispatching system has effected unity of control among stationmasters, but the dispatcher takes no part in train movements within large stations. Furthermore, the dispatcher is obliged to go out several times a month on the line in order to put himself into touch with the various stationmasters. When a dispatcher has carried out his duties for a certain time he is sent back to a large station and another stationmaster is called upon to take over the duties of dispatcher; by this means collaboration between these various officials is increased to a considerable extent. Also, local dispatching offices have been established in Belgium inside big stations. The dispatching system is a real education in train movement control for stationmasters.

Mr. Payet (*French State Railways*) protested against two passages in Mr. Jorissen's paper; it was not correct to state that the dispatching system was introduced in France in 1918 because the

French railways were not able to deal with the traffic service of the American Army; they had even dealt with a very much heavier traffic. Further, the system had not been introduced in order to remedy the inexperience of the numerous additional employees whom it had been necessary to engage. The real reason for the adoption of the system was that it increased traffic, facilitated the control of train movements and generally improved the efficiency of the service. The French and Belgian administrations, which were at the outset very sceptical as to the advantages of the dispatching system, were quickly convinced.

Mr. MOUTIER (*Northern Railway, France*) considered that everyone would agree in recognising the advantages of the dispatching system. It was, however, expedient to draw a distinction between the instrument itself and the method of using it. One could not compare the American system, where conditions were very variable, with the French system, where the timetables are fixed, even in the case of auxiliary trains. Between these two cases there might be other particular cases, as for example an exceptional rush of traffic. It was then that the dispatcher fulfilled a useful role. It would be advisable therefore to leave it to each railway system to settle its own methods of application.

Mr. RENARD (*Eastern Railway, France*) like Mr. Lamalle, was convinced that Mr. Jorissen will become a partisan of the dispatching system as soon as the traffic on the Netherlands Railways justifies its application to them.

On the Eastern Railway of France the local and central dispatching officials received daily a photograph of the preceding day's train diagram, as drawn up by the dispatcher. This was a much more rapid system than examining the reports of guards and stationmasters.

Mr. JORISSEN drew attention to the fact that the dispatching system had also been introduced on lines having small traffic, *e. g.*, in Italy and on the Congo, where it seemed intended chiefly to compensate for a lack of capable staff.

Mr. MAISON (*French Government*) drew special attention to the difference between the systems adopted in France and Belgium and that which was in force in Germany. The only object of the latter was to secure the safety of movement within the station itself, whereas the French and Belgian systems regulate movement from station to station and tend to avoid delays due to incidents en route.

Mr. JORISSEN called attention to the difference which exists between the dispatching systems of the American railroads, that in existence in France and Belgium, and that which is in force on the English railways. In America everything is regulated by the dispatcher without any action on the part of stationmasters. The dispatcher gives his orders to the head guards, who in turn give him any necessary information.

On several Continental railways a mixed system is in force, by which the regulation and the running of trains is more or less in the hands of a dispatcher, but in which the intervention of stationmasters has not been completely eliminated. Finally, there is a third system where there is no centralisation, and everything is regulated by the stationmaster.

Mr. NOBILI (*Italian State Railways*) stated that after a visit he had made to Belgium and France the Italian Railways decided to apply the systems which are in

force in these countries, and that they had every confidence in the success of this step. The dispatcher's range of vision is wider than that of the stationmaster, and he can therefore render service which would be beyond the powers of even the most efficient stationmaster. He said that there were in Italy single lines with very heavy traffic, and they considered that the establishment of the dispatching system would permit of the construction of double roads being dispensed with.

Mr. Jorissen had stated that when a dispatching system was introduced on secondary lines it was generally on account of a lack of staff; this was not the case in Italy, where a start would be made by introducing the dispatching system on secondary lines on which a considerable reduction of staff had recently been made (60 000 employees in two years). The object aimed at is to employ only the strict minimum of staff.

Mr. LAMALLE suggested that in the newer colonial states the dispatching system might be adopted in order to make it possible to entrust the management of stations to native officials.

Mr. BAYLEY (*Sudan Government Railways*) stated that prior to 1922 his railways had a system of central and district control; the introduction of a divisional office had made possible an increase of 30 % in train loads and 20 % in wagon loads. The important point to consider was the result obtained by a control system. On his railways the results had been satisfactory.

Mr. EPINAY pointed out that the advantage of the dispatching system consists in being able to substitute special running, adapted to the needs of the moment, for auxiliary running timed in advance.

Mr. FOLLOWS (*reporter*) suggested that if a certain amount of confusion existed in regard to the various systems, everybody was striving towards one end, and that was to get efficient and economical working. The dispatching system justified itself when traffic was intense; the English railways had been led to instal it in order to avoid doubling certain tracks which were very much used. Mr. Jorissen had criticised the fact that control was often in the hands of lower grade staff. That was a defect of administration rather than a defect in the system. Without train diagrams control could not be effective. Any dispatching system in the hands of capable people should give good results.

Mr. MATTER (*Swiss Federal Railways*) called attention to the fact that the various reports had defined clearly the objects of the dispatching system : 1) rapid handling of trains; 2) increased speed of goods trains; 3) reduced working expenses; but that they had not mentioned the conditions which must be fulfilled in introducing the system; he had personally noted that the organisation of the service in England was quite different from what it was in Switzerland. In the latter country the number of trains was fixed according to very detailed statistics, from which the time-tables and the rosters of the staff were arrived at in advance so as to utilise these in the most rational manner possible. He was not certain that the dispatching system would be of any advantage in Switzerland, where goods trains run with remarkable regularity, safety and speed. In his opinion, the system did not justify itself when the density of the traffic did not exceed a

certain limit and when the station installations were sufficient.

The speaker suggested the following addition to the reporter's summary: « The application of the dispatching system is to be recommended if, on part or on the whole of a railway, the running of trains is complicated either because of the density of traffic during certain periods or throughout the year, or because of local difficulties. The system might also be advantageous in the working of special traffic to or from large ports or large centres. »

The President believed that he might close the general discussion. Seeing that certain of the opinions which had been expressed might give rise to alterations in the proposed summaries, he suggested that paragraphs 1, 2, 3, and 4 should be examined, as these were the chief paragraphs on the actual situation, and as these would lead to a further discussion on more important points.

Paragraph 1. — Mr. Nobili asked if telegraphic communication was used in Belgium, France, or England. Messrs. Follows, Lamalle, and Epinay replied that the telephone was principally used in these countries, but Mr. Epinay stated that in Norway, for instance, the telephone was used for the transmission of simple messages, whereas the Morse telegraphic system was used for instructions given by the dispatchers.

Mr. Pretorian (*Roumanian State Railways*) proposed a slight modification in the text.

Mr. Maison would like the words « special agent » to be substituted for the words « special organisation », in order to emphasize the object of the dispatching system, which is to give unified control.

Mr. Follows objected that the word « agent » obviously indicated a single individual; the word « organisation » answered better to what existed in England.

— The following text was adopted :

« 1. — The dispatching system or control system consists in directing (or supervising, correcting without delay any mistakes which have been committed) certain traffic operations on a section by means of a special organisation which is in rapid telephonic or telegraphic communication with shunting yards, stations, traffic posts and engine depots of the section. The main object of the dispatching system is to speed up the movement of traffic so as to obtain the maximum possible output from each line, reducing the working costs.

« In this sense the dispatching organisation may be required to deal with all or part of the following : Supervision of the running of trains, particularly with a view to ensuring strict observance of the timetable; the giving of orders (or, in the case of certain railways, advice) to stations, with regard to the fixing or changing of shunting points on double lines and of passing or overtaking points on single lines; the running of the number of trains required by the traffic to be handled, by the ordering of auxiliary trains where necessary, and by cancelling certain scheduled trains on days when they can be dispensed with; the loading of trains up to their maximum capacity; selection of the type of engine for each train according to the nature of the work to be performed; changing the route of trains or cancelling trains in case of bad weather, accidents, or fouling of the line; supervision of make-up of trains to obtain

complete trains for the longest distances possible with the least possible number of stops; regulation of traffic in the direction of terminal stations or frontier stations and ports of embarkation; measures for dealing with traffic which does not form part of the regular traffic service; utilisation of engines other than those engaged in scheduled services.

« The dispatching organisation may also extend its activities to cover the following : Distribution of rolling stock; the ordering of drivers, firemen and train staffs and control of their working conditions; the drawing up of running tables and diagrams; notification of official railway time; control of operations in shunting yards. »

PARAGRAPH 2. — Mr. PRETORIAN proposed that the first two sub-paragraphs be combined, and that the remainder be omitted.

— The following text was adopted :

« 2. — Dispatching centres may work independently, subject, however, to coordination with neighbouring centres as regards matters of common interest, or may be grouped under the control of higher dispatching organisations. »

PARAGRAPH 3. — Mr. PRETORIAN considered that point 4 should precede point 3, since it is the complement of point 2. (*Agreed.*)

Mr. MATTER asked if this paragraph was to be interpreted in the sense that the station staffs of the secondary lines in Czecho-Slovakia had duties only in connection with commercial operations to perform.

Mr. EPINAY. — In single line stations there is a somewhat complicated signal system and an arrangement for locking points which requires careful manipulation. In these stations train movement employees have been dispensed with, and signals are worked from a distance; points are locked and the keys are in the possession of head guards. This has made it possible to dispense with one employee per station.

Various speakers proposed the omission of the paragraph, which deals with one exceptional case.

Mr. NOBILI stated that Italy was proposing to apply this system, and Mr. DIREZ said that the French State Railways were also studying the question.

THE PRESIDENT proposed that the paragraph stand, for purposes of record.

— The text of the special report was adopted :

« 3. — Special mention may be made of the dispatching system in operation on the secondary railways of Czecho-Slovakia, where its adoption has made it possible to dispense with service superintendents at stations, the only officials concerned with train movements being the dispatcher and the head guard. »

On the motion of Mr. PRETORIAN paragraph 3 of the special report was divided into two different paragraphs as follows :

« 4. — Rapid communication between the dispatcher and the posts with which he works in the controlled area is effected either by the Morse telegraph or by telephone, generally with a system of conventional calls based on the Morse alphabet.

« In a number of cases use is made of the selector telephone, which appears particularly well adapted to the needs of dispatching work.

« 5. — In most cases the dispatcher

receives from the posts with which he is in contact notification of delays which exceed a certain limit, or of times of departure, arrival, or passing of trains. He records this information on appropriate forms or registers or on a map or in certain cases on a diagram showing the actual running of all trains, this diagram being constantly corrected as each notification is received.

« On lines where the density of traffic is sufficient to warrant it, this latter method appears the most satisfactory, as it gives the dispatcher, at any moment, a complete view of the exact situation regarding every train on his section.

« The same result is obtained on the British railways by means of boards, on which cards corresponding to the various trains move according to the situation of the trains on the line. »

(Paragraph 6, former paragraph 5.)

After a short discussion the following text was adopted :

« 6. — The power possessed by the dispatcher on certain railways to authorise goods trains to run in advance of their time-table when circumstances permit, seems calculated in some cases to improve the circulation of traffic and the output of the line. »

(Paragraph 7, former paragraph 6.)

Mr. Epinay remarked that this observation arose solely from the experience of the British railways, and that it was taken from Mr. Follows' report.

Mr. Follows explained the meaning of the paragraph. Engine crews, train staffs and the running-repairs staff were placed under the control of the traffic superintendent, and unity of control was thereby achieved. The mechanical engineers only had to deal with the construction and repair of engines.

Mr. Maison considered that this question had no direct connection with the dispatching system.

Mr. Lamalle pointed out that the same result had been achieved in Belgium by supplementing the central dispatching staff by one or two officials of the traction service.

Messrs. Payet and Moutier also emphasized the interesting nature of the observation.

Mr. Epinay stated that the question was merely a statement of a very interesting experience and of an experiment which had succeeded on a large scale.

The President moved that the improved results obtained by the London Midland & Scottish Railway be recorded by the adoption of the following paragraph :

« 7. — The officials of certain British railways consider that the economic results of the dispatching system are improved when the locomotive service (current maintenance and utilisation for hauling trains, excluding of course large repairs and construction) is placed under the same control as the traffic service. »

— Adopted.

(Paragraph 8, former paragraph 7.)

Mr. Epinay drew attention to the fact that the suggested wording assumed that the dispatching system had been adopted for well-defined reasons.

The text proposed was adopted without discussion :

« 8. — Wherever it has been adopted,

the dispatching system has made possible an increase in the commercial speed of goods trains, and an increased line output making it possible to defer or dispense with certain work on extensions.

« On railways where the dispatcher controls the loading of trains, it has been found that there is an increase in the tonnage carried per train-kilometre and a decrease in the engine journeys per effective ton-kilometre.

« In all cases the expenses entailed by the adoption of the dispatching system are more than compensated for by the economies resulting from its application. »

THE PRESIDENT invited Mr. Matter to speak in support of the proposition which he had put forward during the general discussion.

Mr. MATTER pointed out that the aim of the dispatching system had been defined, but that the conditions necessitating the use of the system had not been laid down. He proposed therefore that a clause should be added to rectify this omission.

THE PRESIDENT then read the text of Mr. Matter's proposition.

Mr. NOBILI considered that it was not possible to limit the application of the dispatching system to the cases quoted by Mr. Matter. The case of the secondary railways must be added.

THE PRESIDENT explained that no final recommendations could be given. The section should confine itself to stating the instances in which the dispatching system had been installed, and the text could be worded as follows :

« The section noted that the dispatching system had been installed when the position of the companies concerned was one of the following :

« 1) The whole or part of the railway system suffering from temporary or permanent difficulties resulting principally from density of traffic;

« 2) The whole or part of the railway system having to deal with an exceptional traffic (to or from ports or large towns);

« 3) Single lines carrying a very heavy traffic;

« 4) Lines of secondary importance (reduction of traffic staff at stations);

« 5) Colonial railways where there is a scarcity of qualified staff. »

After a discussion in which the PRESIDENT, the SPECIAL REPORTER, and Messrs. MAISON, MATTER, LAMALLE, NOBILI and PRETORIAN took part, the section decided not to include the proposed paragraph.

The text adopted by the section was therefore as follows :

Final summary.

« 1. — The dispatching system or control system consists in directing (or supervising, correcting without delay any mistakes which have been committed) certain traffic operations on a section by means of a special organisation which is in rapid telephonic or telegraphic communication with shunting yards, stations, traffic posts and engine depots of the section. The main object of the dispatching system is to speed up the movement of traffic so as to obtain the maximum possible output from each line, reducing the working costs.

« In this sense the dispatching organisation may be required to deal with all or part of the following : Supervision

« of the running of trains, particularly « with a view to ensuring strict obser- « vance of the timetable; the giving of « orders (or, in the case of certain rail- « ways, advice) to stations, with regard « to the fixing or changing of shunting « points on double lines and of passing « or overtaking points on single lines; « the running of the number of trains « required by the traffic to be handled, « by the ordering of auxiliary trains « where necessary, and by cancelling « certain scheduled trains on days when « they can be dispensed with; the load- « ing of trains up to their maximum « capacity; selection of the type of engine « for each train according to the nature « of the work to be performed; changing « the route of trains or cancelling trains « in case of bad weather, accidents, or « fouling of the line; supervision of « make-up of trains to obtain complete « trains for the longest distances pos- « sible with the least possible number of « stops; regulation of traffic in the di- « rection of terminal stations or frontier « stations and ports of embarkation; « measures for dealing with traffic which « does not form part of the regular traffic « service; utilisation of engines other « than those engaged in scheduled ser- « vices.

« The dispatching organisation may « also extend its activities to cover the « following : Distribution of rolling « stock; the ordering of drivers, firemen « and train staffs and control of their « working conditions; the drawing up of « running tables and diagrams; notifica- « tion of official railway time; control of « operations in shunting yards.

« 2. — Dispatching centres may work « independently, subject, however, to co- « ordination with neighbouring centres « as regards matters of common interest, « or may be grouped under the control of « higher dispatching organisations.

« 3. — Special mention may be made « of the dispatching system in operation « on the secondary railways of Czecho- « Slovakia, where its adoption has made « it possible to dispense with service su- « perintendents at stations, the only « officials concerned with train move- « ments being the dispatcher and the « head guard.

« 4. — Rapid communication between « the dispatcher and the posts with « which he works in the controlled area « is effected either by the Morse telegraph « or by telephone, generally with a « system of conventional calls based on « the Morse alphabet.

« In a number of cases use is made of « the selector telephone, which appears « particularly well adapted to the needs « of dispatching work.

« 5. — In most cases the dispatcher « receives from the posts with which he « is in contact notification of delays « which exceed a certain limit, or of « times of departure, arrival, or passing « of trains. He records this information « on appropriate forms or registers or on « a map or in certain cases on a diagram « showing the actual running of all « trains, this diagram being constantly « corrected as each notification is « received.

« On lines where the density of traffic « is sufficient to warrant it, this latter « method appears the most satisfactory, « as it gives the dispatcher, at any mo- « ment, a complete view of the exact « situation regarding every train on his « section.

« The same result is obtained on the « British railways by means of boards on

« which cards corresponding to the « various trains move according to the « situation of the trains on the line.

« 6. — The power possessed by the « dispatcher on certain railways to autho- « rise goods trains to run in advance of « their timetable when circumstances « permit, seems calculated in some cases « to improve the circulation of traffic « and the output of the line.

« 7. — The officials of certain British « railways consider that the economic « results of the dispatching system are « improved when the locomotive service « (current maintenance and utilisation « for hauling trains, excluding of course « large repairs and construction) is « placed under the same control as the « traffic service.

« 8. — Wherever it has been adopted, « the dispatching system has made pos- « sible an increase in the commercial « speed of goods trains, and an increased « line output making it possible to defer « or dispense with certain work on « extensions.

« On railways where the dispatcher « controls the loading of trains, it has « been found that there is an increase in « the tonnage carried per train-kilometre « and a decrease in the engine journeys « per effective ton-kilometre.

« In all cases the expenses entailed by « the adoption of the dispatching system « are more than compensated for by the « economies resulting from its applica- « tion. »

— The General Meeting ratified this final summary at its meeting on the 1 July.

QUESTION VIII.

Suburban services.

General organisation of suburban services, including tubes, on lines exclusively used as such, or those not used for this purpose only (lay-out of stations and lines, signalling, rolling stock, timetables, etc.).

Preliminary documents.

1st report (America and British Empire), by Messrs. E. C. Cox and A. R. Cooper. (See English edition of the *Bulletin*, January 1925, p. 31, or separate issue [with red cover] No. 12.)

2nd report (other countries), by Mr. Direz. (See English edition of the *Bulletin*, March 1925, p. 583, or separate issue [with red cover] No. 23.)

Special reporters : Messrs. E. C. Cox and A. R. Cooper. (See English edition of the *Bulletin*, June 1925, p. 2136.)

Report of the 3rd section.

(See *Daily Journal of the session*, No. 5, p. 8 and No. 7, p. 3.)

The following notes which were received before the discussion are to be added to the remarks of Mr. Direz (report No. 2).

Since the particulars asked for were supplied to the Reporter, the actual situation of the Eastern Railway has altered considerably.

The object of the present notes is to bring forward the more interesting of those alterations which it has not been possible to mention in the report.

Since the 5th of April a new service has been instituted from Paris-Bastille with the object of providing for the ever-increasing numbers of passengers. The proposal was to despatch, during the

busiest hour, nineteen trains giving about 20 000 seats.

Installation. — The station comprises five platform roads and one middle road partially doubled. There are only two roads between two platforms, so that the engines bringing in the trains must be shunted out on the road on which they arrive, or on the road alongside which they can reach by means of a traverser. It has, however, been found necessary to consider dispensing with these traversers as they are at present under reconstruction with the object of making them suitable for heavier engines.

There is, unfortunately, not sufficient room to lay down dead-end sidings for stabling engines, as has been done at Liverpool Street.

Block system. — The block system installed a year ago is automatic with a track circuit. On leaving La Bastille, the sections are 250 m. (270 yards) in length. Beyond these the sections are increased in length, and over the first 11 km. (6.8 miles) it is possible in practice for two trains to follow one another at two-minute intervals.

Principles of the new service. — The station working has been studied with a view to despatching the maximum number of trains and the time-table both from and into La Bastille has been drawn up on this basis. The same applies to the movements of the engines. Alterations which have been made in the interlocking and in the laying down of new switches allow a train to be received on each road at the same time as a train leaves from the adjacent road. The engine which has brought in the rake of the next train out follows the latter out and shunts back on to the rake which has just come in. The engine, however, which has brought a train into Road 5 (the line furthest to the right looking up the line), after following its train out, runs to the depot on the left of Road I.

In this way drivers and shunters have never any hesitation as to the movement which has to be carried out.

Improvements still to be effected. — The output is at present limited to the figures reached since 5 April, seeing that although it is possible to despatch trains at two-minute intervals it is not possible to receive the empty rakes at less than three-minute intervals. An old regulation lays down that all trains must come to a stop at the calling-on signal at the entrance to the station, even though there may be a road free, and this unjustifiable stop reduces the output appreciably. The removal of this out-of-date arrangement is under consideration, and if it is done away with four minutes will be gained every five trains.

Summary. — The experience thus gained shows clearly that, in accordance with the summary made by the Reporter, it is possible appreciably to increase the output by a systematic study of the details of the working.

It proves, furthermore, that a high output is only to be realised if the departures from and entries into a station and the movements of trains generally are made without delay. The scene at Liverpool Street Station every morning shows that this is perfectly compatible with safe working.

The President, Mr. du Castel, *stated that the question under discussion was of considerable interest at the present day in view of the housing difficulty for the working classes.* He suggested that the special report, which was a very complete one, should be discussed chapter by chapter and the summary, paragraph by paragraph, as it was probable that it would be possible to condense the latter. He called upon Mr. Cox.

Mr. Cox read the beginning of the special report and stated that he considered

it preferable to draw up a special list of paragraphs and he read the first of the proposed paragraphs for the summary.

THE PRESIDENT called attention to the supplementary report above.

M. DIREZ (*reporter*) thought that two questions required examination : the output of the terminal station and the output of the line. The output of the line may be increased by reducing the length of the block sections. Surface railway systems worked by steam locomotives do not come into this class, because the output of their lines is limited by the capacity of the terminal stations. One means for increasing this capacity is electrification; another is the simplification of the shunting operations. Loops are also of advantage.

Mr. PICK (*Underground Electric Railways Company of London, Ltd.*) desired to define the term « suburban ». Messrs. Cox and Cooper had alluded to journeys that might amount to 50 miles, whereas Mr. Direz had only talked of a quarter of this distance. It would also be necessary to make a distinction between the urban service and the suburban service, in the first place because large terminal stations are not desirable in large cities and in the second place because it is necessary to afford facilities for changing from the one train service to the other. Mr. Direz had mentioned that it had been necessary to use rolling stock carrying more standing than seated passengers; in this respect also it was necessary to make a distinction between suburban and urban services.

Mr. DIREZ explained that the suburban service could best be defined as that carrying passengers resident outside the city who made journeys to and from the city in connection with their affairs, making consequently two or four journeys a day.

Mr. THOMAS (*Underground Electric Railways Company of London, Ltd.*) thought that in terminal stations three lines should be provided instead of two. No objection could be raised to loops, though there were few of these in London, provided that a separate platform was provided for each direction of running and a stabling siding as well.

The following text was adopted :

« 1. — To obtain the maximum output from suburban services in the terminal and intermediate stations, it is necessary to make a close investigation into all the requirements and possibilities, an investigation that includes the determining of fixed timetables for the times during which trains are standing at the platforms, for the movements of the locomotives and the execution of simultaneous operations at the junctions.

« In order to obtain the maximum use of the available area in terminal stations a platform should be provided between each pair of tracks.

« In intermediate and junction stations island platforms enable a saving in staff to be effected and facilitate the passenger changes.

« Special arrangements should be provided in terminal stations in or near cities for effecting passenger changes between the suburban trains and the urban railway system. »

2. — Mr. Cox proposed a new text.

Resort had been made to various means for increasing the capacity of the main lines : fly-over crossings, reduction in length of block sections, installation of

track circuits and sometimes automatic signalling and, finally, repeating the signals.

Mr. Cooper (*reporter*) pointed out that the Underground Railways had definitely adopted the type of escalator called the « Comb », which is slightly less costly and is, moreover, reversible.

Mr. H. A. Watson (*London & North Eastern Railway*) pointed out that the installation of loops at the termini of surface railways was generally difficult on account of want of space. He called attention to the advantages offered by island platforms.

Major Hall (*British Government*) drew attention to the importance of a suitable system of signalling, which would allow express and suburban trains to run over the same lines.

Up to the present time it had generally been possible to reserve separate tracks for suburban and main line services, but with the increasing density of the traffic it would be necessary to find a method of signalling suitable for both kinds of traffic. A system of this type is that described by Mr. Thorrowgood using coloured lamps by day as well as by night. (See question IX.)

Mr. Direz was entirely in agreement with Major Hall and mentioned the importance, in this respect, of the automatic block and luminous signals.

In reply to a question asked by Mr. Lamalle (*Belgian State Railways*), Mr. Direz stated that the automatic block is permissive.

The following text was adopted :

« 2. — The adoption of loops allows the re-dispatching of trains to be effected with the minimum of interference in the movements of the locomotives and the trains.

« Instances of the application of this system are, however, not common and the arrangement for stabling sidings for locomotives at terminal stations and of fly-over crossings enables the interference in the movements to be reduced.

« Automatic signalling with track circuits increases the capacity of the line and facilitates the working; the application of this system with luminous signals having multiple aspects allows increased capacity to be obtained particularly on lines that carry various classes of traffic. »

3. — Mr. C. F. Smith (*New York Central Railroad*) stated that on his road they had had no experience of compartment stock, saloon stock being necessitated by the fact that the station platforms were at a lower level than the carriage floors and that the fares had to be collected *en route*. On short sections it was often necessary to allow standing, but on long journeys every endeavour was made to provide a seat for every one, although, of course, at times of intense traffic this could not be done in every case. He found that the loading and unloading of passengers at intermediate stations was rapid enough with the saloon system.

Mr. Payet (*French State Railways*) objected to the definite nature of the statement with regard to the kind of rolling stock. Compartment stock should be preferred for long journeys. On the French State Railways saloon stock is preferred for the lines that have been electrified because it allows the made-up trains to be interchanged, which can consequently be used either for the near zone or for the distant zone.

Mr. Coates (*Oudh and Rohilkhand Railway, British India*) asked Mr. Smith whether, in America, lavatories were fitted on suburban trains; he asked what steps were taken when the rush became so great that seats could not be found for all the passengers.

Mr. C. F. Smith replied that lavatories were fitted on all carriages. In case of exceptional rush passengers are allowed to stand, but the permissible load is never exceeded. An endeavour is always made to have spare vehicles in readiness at the terminal stations.

Mr. Renard (*Eastern Railway, France*) spoke in favour of the compartment system, combined with the « impériale » as in use on the Eastern Railway. It was not quite fair to say that this stock was not favoured by the public. The passengers generally preferred sitting to standing. Loading and unloading passengers took rather a long time, but on the other hand more passengers could be carried per train. Very good efficiency could therefore be obtained with this arrangement.

Mr. Clow (*London & North Eastern Railway*) stated that his company dealt with a daily average of 250 000 passengers by the sole use of compartment stock. Stops at intermediate stations did not exceed 25 seconds, whereas 40 seconds would be necessary with any other system.

Mr. B. G. Smith (*Under Secretary of State for India*) stated that in his experience the compartment system was more favourable to quick working at intermediate stations.

Mr. Payet stated that on the French State Railways on which they were in process of electrifying all suburban services, the stops made with trains consisting of six to eight saloon carriages did not exceed 30 seconds. It was therefore necessary to make a distinction between the steam services and the electric services.

Mr. Direz added that these carriages are fitted with three double doors giving a wider opening.

Mr. Graham (*Great Indian Peninsula Railway*) spoke in favour of the saloon type of stock, which he had found most suitable in dealing with the heavy traffic in Bombay.

The following was adopted :

« 3. — Saloon-type stock without compartments is preferable for urban lines on which the passengers make short journeys only, where the stations are only about half a mile (800 m.) apart, and where the provision of large seating capacity is of less importance.

« The carriages of suburban trains should afford large transport capacity per unit of length, and should be fitted with several doorways of large size.

« When the platform allows, and in the case of the service to the suburbs near the city, this method is equally economical.

« In the case of the outer suburbs, compartment stock is more usually adopted because of the greater seating accommodation it provides.

« For the outer suburban traffic, compartment stock is generally used on account of the greater seating capacity it provides. »

4. — Mr. H. A. Watson stated that the experience gained on the London & North Eastern Railway permitted him to agree

fully with the proposed text, and the following was adopted :

« 4. — In rush hours, when trains leave at short intervals, good results may be obtained both with regard to economy and overall speed of the trains, by means of a zone system of stopping stations, which enables the loads to be concentrated and distributed to as few destinations as possible; it is nevertheless necessary that stops at sufficiently short intervals should be made during rush hours at all stations according to their importance.

« The most satisfactory service and that which is most economical for slack periods is obtained with trains of shorter length running at regular intervals and usually stopping at all stations.

« The use of multiple unit stock in the case of electric traction gives the maximum elasticity to suburban services.

« It is desirable that railways should be authorised to close some stations, in the neighbourhood of the terminus, of minor importance where the receipts are small and the costs of working are heavy. »

5. — Mr. Cox (*special reporter*) stated that he had received very little data relating to passenger fares. In general, these were always lower than the main line fares.

M. F. Level (*Local Railways, France*) pointed out that the big companies were competing with the cheap transport companies. He considered that every service given ought to cover its cost, and proposed an addition to the text.

Mr. Lamalle considered that if this rule were applied to the cost of transport of passengers on the main lines this would become prohibitive.

Mr. Moutier (*Northern Railway, France*) thought that the discussion should be confined to suburban services.

Mr. Cox said that the state of affairs in question existed in all countries; he thought it better to treat the question in general terms and to keep to the best that had been proposed.

The following text was adopted :

« 5. — The fares charged for different kinds of passenger traffic vary greatly in different countries.

« The principle that each kind of traffic should cover its own direct costs of working is generally accepted in the case of suburban services. »

The President read the text, as follows, to be submitted to the general meeting.

Final summary.

« 1. — To obtain the maximum output « from suburban services, in the terminal « and intermediate stations, it is neces- « sary to make a close investigation into « all the requirements and possibilities, « an investigation that includes the de- « termining of fixed timetables for the « times during which trains are standing « at the platforms, for the movements of « the locomotives and the execution of « simultaneous operations at the junc- « tions.

« In order to obtain the maximum use « of the available area in terminal sta- « tions a platform should be provided « between each pair of tracks.

« In intermediate and junction stations « island platforms enable a saving in « staff to be effected and facilitate the « passenger changes.

« Special arrangements should be pro- « vided in terminal stations in or near

« cities for effecting passenger changes « between the suburban trains and the « urban railway system.

« 2. — The adoption of loops allows « the re-dispatching of trains to be « effected with the minimum of inter- « ference in the movements of the loco- « motives and the trains.

« Instances of the application of this « system are, however, not common and « the arrangement for stabling sidings « for locomotives at terminal stations and « of fly-over crossings enables the inter- « ference in the movements to be reduced.

« Automatic signalling with track cir- « cuits increases the capacity of the line « and facilitates the working; the appli- « cation of this system with luminous « signals having multiple aspects allows « increased capacity to be obtained par- « ticularly on lines that carry various « classes of traffic.

« 3. — Saloon-type stock without com- « partments is preferable for urban lines « on which the passengers make short « journeys only, where the stations are « only about half a mile (800 m.) apart, « and where the provision of large seating « capacity is of less importance.

« The carriages of suburban trains « should afford large transport capacity « per unit of length, and should be fitted « with several doorways of large size.

« When the platform allows, and in the « case of the service to the suburbs near « the city, this method is equally econom- « ical.

« In the case of the outer suburbs, « compartment stock is more usually « adopted because of the greater seating « accommodation it provides.

« 4. — In rush hours, when trains « leave at short intervals, good results « may be obtained both with regard to « economy and overall speed of the trains, « by means of a zone system of stopping « stations, which enables the loads to be « concentrated and distributed to as few « destinations as possible; it is neverthe- « less necessary that stops at sufficiently « short intervals should be made during « rush hours at all stations according to « their importance.

« The most satisfactory service and « that which is most economical for slack « periods is obtained with trains of « shorter length running at regular « intervals and usually stopping at all « stations.

« The use of multiple unit stock in the « case of electric traction gives the maxi- « mum elasticity to suburban services.

« It is desirable that railways should « be authorised to close some stations, in « the neighbourhood of the terminus, of « minor importance where the receipts « are small and the costs of working are « heavy.

« 5. — The fares charged for different « kinds of passenger traffic vary greatly « in different countries.

« The principle that each kind of « traffic should cover its own direct costs « of working is generally accepted in the « case of suburban services. »

This summary was ratified by the general meeting on the 1 July 1925.

QUESTION IX.

Fixed signals.

Fixed signals. Principles of signalling for lines with dense traffic and for large stations. Form of day and night signals. Automatic block signals, signal lights.

Preliminary documents.

1st report (America), by Mr. W. H. Elliott. (See English edition of the *Bulletin*, November 1924, p. 907, or separate issue [with red cover] No. 5.)

2nd report (all countries, except America, the British Empire, Italy, Belgium, Holland, Denmark, Norway and Sweden), by Mr. Laigle. (See English edition of the *Bulletin*, February 1925, p. 439, or separate issue [with red cover] No. 20.)

3rd report (British Empire), by Mr. W. J. Thorrowgood. (See English edition of the *Bulletin*, January 1925, p. 79, or separate issue [with red cover] No. 13.)

4th report (Italy, Belgium and Holland), by Mr. C. De Benedetti. (See English edition of the *Bulletin*, May 1925 [2nd part], p. 1937, or separate issue [with red cover] No. 44.)

Special reporter : Mr. C. De Benedetti. (See English edition of the *Bulletin*, July-October, 1925, p. 2161.)

Report of sections II and III combined.

(See *Daily Journal of the session*, No. 4, p. 4.)

Mr. du Castel,
president of the 3rd section, in the chair.

Mr. De Benedetti (*special reporter*) read a résumé of his report.

The President proposed to open the general discussion on the question of signals, especially on the view put forward by certain countries that two-position signals were insufficient, although other administrations work lines carrying very heavy traffic by means of two-position signals.

Mr. Maison (*French Government*) stated that in France there are lines which carry a heavy traffic and where two-position signals are sufficient.

Three-position signals have advantages, but it is incorrect to say that it is impossible to work lines carrying heavy traffic with two-position signals.

Mr. Moutier (*Northern Railway, France*) made some observations in the same strain. The three-position signal itself may even be insufficient in some cases. The reporter prefers semaphore signals to disc signals. However, during the night only the lamps are visible and consequently the shape of the signal used by day is not as important as the report leads one to imagine. It might be advisable to give the driver information as regards the running of the train, as regards speed reductions or direction to be taken, but the three-position semaphore can only give three indications and is therefore in some cases insufficient.

Mr. De Benedetti. — In Italy, a two-position semaphore is used preceded by a distant signal which has also two positions. Disc signals are also used. The need is felt of adding to the signal system by giving the stop signal three positions : « Stop », « Caution » and « Line clear ».

Mr. Thorrowgood (*reporter*). — The two-position signal is sufficient for lines on which the traffic is light. The three-position signal is satisfactory if the block sections are of equal length. In the case of a long section, the driver should proceed at reduced speed throughout the whole of its length if the signal gives a reduced speed indication. On main lines, four positions are required.

Mr. Pellarin (*Eastern Railway, France*). — The density of traffic has nothing to do with the three-position signal. The

question should be dealt with purely from the point of view of a reduction of indications given to the driver.

At the suggestion of the PRESIDENT, the further consideration of clause 1 was adjourned to the end of the meeting, seeing that the discussion of the other items might have the effect of making it necessary to alter the wording of this clause, the deletion or alteration of which had been suggested by some of the delegates.

Discussion of clause 2 of the draft summary :

Messrs. MOUTIER, PELLARIN and MAISON suggested alterations in the wording of the text.

Mr. THORROWGOOD pointed out that if the two-position signal is insufficient, one could obtain, with two arms each having three positions, six indications, although only four were required.

The English signal engineers would like to see the number of indications reduced, as they consider that there is no need to give the driver a signal to reduce speed, all that was required being to give him information as to the position of the next signal. The four-position signal enables the driver to be given the four indications necessary, each by one definite position.

Mr. WASIUTYNSKI (*Polish State Railways*) proposed that the words « preferably in the latter » should be deleted, as this implies that one of the positions is a vertical one, which in his opinion is not desirable.

THE PRESIDENT remarked that in that case it would also be necessary to delete the words « in the lower and upper quadrants ». — The following wording was agreed to :

« When three-position signals are used, the movable arms should give the three following indications : « Stop », « Caution » and « Clear ». Other indications as to speed should be given by the relative positions of two three-position arms. »

Discussion on clause 3 :

Clause 3 as follows was agreed to without amendment :

« The most suitable lights corresponding with the three positions of the arm are red for « Stop », yellow for « Caution » and green for « All clear ».

Discussion on clause 4 :

Mr. PELLARIN and Mr. LE BESNERAIS (*Northern Railway, France*) considered that there was no immediate reason for removing shunting signals of various types used in stations.

Mr. MOUTIER pointed out that at some stations and yards there are no shunting signals.

Mr. WASIUTYNSKI considered it desirable that the signals controlling shunting movements should be different in form from those used on the running lines.

Mr. THORROWGOOD pointed out that in England only two colours are used for shunting signals; these signals only indicate that the line is clear between two signals.

In order that it should not be necessary to pass a shunting signal in the « on » position the English signal engineers are looking for a means to put the shunting signals at the « off » position, at the same time as the running line signals.

— On the proposal of several delegates it was decided to delete clause 4.

Discussion on clause 5 :

— After discussion, in which Mr. Renard (*Eastern Railway, France*), Mr. Thorrowgood and Mr. Hachon (*Paris-Lyons-Mediterranean Railway*) took part, the text of clause 5 was altered as follows :

« Whatever method of signalling is adopted, when the warning signals, although they may be erected at well-chosen spots, are not sufficiently visible or are placed in neighbourhoods exposed to the possibility of fog, it is advisable to give warning of their nearness by using definite marks such as the white boards or diagonal stripes on the posts before the signals, etc., so that the installation of a second warning by acoustic signals, fog signals, or luminous repeating signals, may be avoided as far as possible. »

Discussion on clause 6 :

Mr. Thorrowgood considered that a lamp with double filament is preferable to two separate lamps and suggested one filament for ordinary use and one reserve filament having about 40 % of the intensity of the ordinary filament.

The President announced that Mr. Faeris (*Italian State Railways*) suggested replacing the words « should be » by the words « it might be advisable ».

Mr. Hachon considered that the question was not relevant, and suggested the deletion of the clause.

— After discussion by Messrs. Renevey (*Alsace-Lorraine Railways*), Thorrowgood, Cambournac (*Northern Railway, France*), Epinay (*Paris-Orleans Railway*) and Moutier, the sections agreed on the following text proposed by the President :

« If suitable current is available, it might be advisable to substitute electric lighting gradually for the mineral oil lamps almost universally in use; the technical measures on the system which have adopted this method of lighting are in general that in case of the lamp being extinguished, a standby and as far as possible a system of control shall be in operation. »

Discussion on clause 7 :

Mr. Hachon proposed that the words « particularly for use on lines worked by electric traction » should be deleted, because the electricity available along these lines is not as a rule usable without transformation.

Mr. Moutier considered that the text was too strong, seeing that the introduction of this method of signalling might be very costly.

Mr. Thorrowgood explained a new system of luminous signals which will be introduced in the near future on one of the lines of the Southern Railway, Great Britain.

These will be four-position signals; one red light for « stop », one yellow light « proceed and stop at following signal », two yellow lights « proceed, next signal at caution », one green light « proceed without restriction ». Route indicators are provided where necessary.

Mr. Direz (*French State Railways*) announced that their experience on the French State system had given very interesting results and that luminous signals are to be recommended.

— The following text was adopted :

« The sections note the progress made in the application of luminous signals, and also the convenience and safety obtained by their use. They are of the opinion that it is advisable that their use should be considered and investigated in those districts where electric power is obtainable, more especially on the lines operated by electric traction. »

Discussion on clause 8 :

— Clause 8 was adopted without discussion :

« The gradual application of the automatic block compatible with local conditions, utilising the system which is most suitable, combined in certain places with luminous signals, is recommended. »

Resumed discussion on clause 1 :

Mr. Thorrowgood again declared his preference for four-position signals, and after Mr. Wasiutynski had spoken, the President, in accord with Messrs. Fabris and De Benedetti, reminded the meeting that the discussions had shown that opinions were very divided on the value of systems with two, three, and four positions. In his opinion uniformity of signals was not essential, because drivers as a rule remained on their own lines. He took pleasure in recalling the excellent conditions is which the English drivers have driven trains on the French lines. On these lines the method of signalling differs entirely from that in use on the English lines, and he proposed to the sections the following clause of the final summary.

« The sections note that certain administrations operate successfully lines with very heavy and with mixed traffic by using only « stop » and « caution » signals with two positions. Others prefer three-position semaphores and yet others consider a fourth position indispensable.

« In these circumstances the sections consider that signalling systems should be further examined and experimented with in accordance with the ideas of each line, and that it would be advisable to put this question on the Agenda of the next Congress, so that each country may profit by the experience and the results which will be obtained during the coming five years. »

— This resolution was carried unanimously.

The President. — The following is the text which we propose to submit to the General Meeting :

Final summary.

« 1. — The Congress notes that certain « administrations operate lines with « heavy traffic and with mixed traffic by « using only « Stop » and « Caution » « signals with two positions. Others « prefer three-position semaphores and « yet others consider a fourth position « indispensable.

« In these circumstances the Congress « considers that signalling systems should « be further examined and experimented « with in accordance with the ideas of « each line, and that it would be advisable « to put this question on the Agenda for « the next Congress, so that each country « may profit by the experience and the « results which will be obtained during « the coming five years.

« 2. — When three-position signals « are used, the movable arms should give « the three following indications: « Stop », « « Caution » and « Clear ». Other indi-

« cations as to speed should be given by « the relative positions of two three-po- « sition arms.

« 3. — The most suitable lights cor- « responding with the three positions of « the arm are red for « Stop », yellow for « « Caution » and green for « All clear ».

« 4. — Whatever method of signalling « is adopted, when the warning signals, « although they may be erected at well- « chosen spots, are not sufficiently « visible or are placed in neighbourhoods « exposed to the possibility of fog, it is « advisable to give warning of their « nearness by using definite marks such « as the white boards or diagonal stripes « on the posts before the signals, etc., so « that the installation of a second warn- « ing by acoustic signals, fog signals, or « luminous repeating signals, may be « avoided as far as possible.

« 5. — If suitable current is available, « it might be advisable to substitute « electric lighting gradually for the « mineral oil lamps almost universally in « use; the technical measures on the « system which have adopted this method « of lighting are in general that in case « of the lamp being extinguished, a « standby and as far as possible a system « of control shall be in operation.

« 6. — The Congress notes the pro- « gress made in the application of « luminous signals, and also the conve- « nience and safety obtained by their use. « It is of the opinion that it is advisable « that their use should be considered and « investigated in those districts where « electric power is obtainable, more espe- « cially on the lines having electric trac- « tion.

« 7. — The gradual application of the « automatic block compatible with local « conditions, utilising the system which « is most suitable, combined in certain « places with luminous signals, is recom- « mended. »

— The General Meeting ratified this final summary at the meeting held on the 27 June.

SECTION IV.

General.

President : Dr. J. H. Parmelee.

Vice-presidents : J. Eberhardt, Sir Herbert A. Walker, Dr. C. C. Wang and Rollin H. Wilbur.

Principal secretary : L. Santini.

QUESTION X.

The eight-hour day.

The eight-hour day on the railways.

Preliminary documents.

1st report (Switzerland, Italy, Spain and Portugal), by Mr. L. Velani. (See English edition of the *Bulletin*, May 1925 (2nd part), p. 1997, or separate issue [with red cover] No. 46.)

2nd report (all countries, except Switzerland, Italy, Spain, Portugal, America and the British Empire), by Mr. Soulez. (See English edition of the *Bulletin*, May 1925 (2nd part), p. 1735, or separate issue [with red cover] No. 43.)

3rd report (America and the British Empire), by Mr. W. Clower. (See English edition of the *Bulletin*, May 1925 (1st part), p. 1481, or separate issue [with red cover] No. 38.)

Special reporter : Mr. W. Clower.

Report of the 4th section.

(See *Daily Journal of the session*, No. 2, p. 7; No. 3, p. 7; No. 4, p. 5; No. 5, p. 7 and 8, and No. 6, p. 5.)

Meeting on 23 June.

The President called upon Mr. W. Clower, *special reporter*, who read a summary which he had prepared of the reports of Messrs. Velani and Soulez, as well as his own, on question X, *viz.*, the « Eight-hour day ».

The reading of Mr. Clower's report occupied the greater part of the meeting, and upon its completion the President invited each of the other two reporters to make any further remarks they thought fit either on Mr. Clower's summary or on their own reports.

At the opening of the afternoon meeting the President emphasised the vital importance of the question and, in order to facilitate the proceedings, laid stress upon three main points which appear to emerge from the report :

1) The difference between eight hours of actual work and eight hours of presence;

2) If the eight-hour day is to be effective it must consist of eight hours actual work;

3) The necessity of the employees performing more work per hour.

Dr. Tcheou Weï (*Chinese Government*) pointed out that an Official Regulation dated 29 March 1923 (article 6), dealt with the question of the eight-hour day for certain categories of employees, and added that a Bill had been introduced by the Minister of Communications in April, 1925, which had not yet been adopted.

Mr. Hill (*South African Railways*) referred to the special conditions prevailing in his country which made the application of the eight-hour day extremely difficult. According to his experience, the first question to be decided by the Section was whether the eight-hour day would be practicable from the railway point of view.

Mr. Eberhardt (*Polish State Railways*) stated that despite the fact that Poland had participated in the Washington Conference, the Convention had not been ratified, and the eight-hour day has been adopted in principle in Poland, in accordance with formulæ determined by agreements between the Administration and the staff. As the result of these agreements, it has been found possible to reduce the number of employees, which had previously been too great.

Dr. Wang (*Chinese Government*) stated that his country had not as yet adopted the principle of the eight-hour day, but it was under consideration. He pointed out that as in South Africa, there were special circumstances, climatic and others, which rendered the strict application of the principle extremely difficult.

He brought out more particularly the question of the effect of the different kinds of work on the human machine, the principal object of the eight-hour day being the most economic use of human energy.

Mr. Barlow (*British Government*) asked for the experience of those countries which had adopted the eight-hour day and had subsequently been obliged to abandon or modify it, more especially in regard to Czecho-Slovakia and to France, where the forty-eight-hour week is a very prominent question.

Mr. Soulez (*reporter*) replied that details concerning Czecho-Slovakia were to be found in his report, and as regards the forty-eight-hour week in France this has not yet been adopted.

Mr. Silva (*Portuguese State Railways*) spoke of conditions existing in Portugal, and pointed out the difference between railways and other industries in respect of the eight-hour day.

Mr. Keogh (*Great Southern Railway, Ireland*) stated that Ireland came under the category of those countries where rail-borne traffic is very light. The eight-hour day which had been introduced into Ireland during the war, in common with the rest of the British Isles, was not suitable to this country. He asked if, in South Africa the modifications mentioned by Mr. Hill had been adopted as a result of an agreement between the Management and the employees or whether the Management acted of its own volition.

Mr. Hill replied that although the employees had been fully consulted on the subject of hours of work, the most recent rules had been fixed by the administration.

Mr. Mason (*New Zealand Government Railways*) drew attention to the difference between the forty-eight-hour week and the eight-hour day, and showed the difficulty of adopting this in his country where circumstances rendered it unsuitable.

Col. LOREE (*Delaware & Hudson Railroad*) stated that generally speaking the eight-hour day had not been adopted in the United States. Two experiments were, however, being conducted, the one on the Detroit, Toledo and Ironton Railway and the other on his own system, the latter with a sliding scale of eight to twelve hours per day in accordance with the nature of the work performed and the former with a maximum 208 hours' month.

No further discussion offering, the PRESIDENT called upon Sir Evelyn CECIL (*Southern Railway, Great Britain*) to read to the delegates a suggested resolution for submission to the Congress, which would form the subject of discussion and possible amendment at to-morrow's meeting.

The suggested resolution as below was then read by Sir Evelyn Cecil :

« That section IV is of opinion, after full statements by the representatives of the different countries, that a rigid eight-hour day as laid down in the Washington convention is not practicable, but can only be adopted with limitations in accordance with varying local conditions and requirements. »

Meeting on 24 June.

THE PRESIDENT, Dr. J. H. PARMELEE, opened the meeting, and before throwing open to discussion the question of the eight-hour day which had already been dealt with at the two meetings on Wednesday, he submitted a report of his own on the consequences of the reduction of the hours of work on the railways of the United States of America.

On the suggestion of Dr. Wang, it was agreed to publish this report *in extenso*.

REPORT BY DR. PARMELEE.

As supplementary to that part of the report of Mr. Clower dealing with the United States, he has kindly consented to the presentation of a brief statement by me.

In discussing the eight-hour day in the United States, a clear distinction must be made between the train and engine forces on the one hand, and the shop and maintenance of way and clerical forces on the other hand.

With respect to the train and engine forces, two statements may be made. First, their hours cannot be rigidly fixed, but must be regulated by the necessities of train operation; secondly, they are usually paid by the mile rather than by the hour, with extra compensation if their average speed per hour falls below an agreed minimum. Thus they are compensated on a modified piece-work basis.

Prior to 1917, train and engine crews in the freight or goods service were usually paid on the basis of 100 miles per day, 10 miles per hour—that is, their normal day was ten hours. Crews in the passenger service have always been on a basis of less than eight hours per day, usually 100 miles per day, at a speed of 20 miles or more per hour, with a normal day of five hours or less.

In 1916, the train and engine employees threatened to strike unless granted an eight-hour day, and the threat was sufficient to bring about a Federal law, effective 1 January 1917, making eight rather than ten hours the basis of a day's work. That law did not fix the day at eight hours, but made eight hours the basis of work and of pay. This required the railways to speed up their freight trains from 10 miles per hour to 12 1/2 miles per hour, or to pay overtime after eight hours. While some trains have been so speeded up, the location of terminals and the density of traffic have made it impracticable to do so in all

cases, and the law has increased the cost of train operation in the neighbourhood of $100 000 000 per year.

In brief, the employees secured under this law what they really sought : not so much a reduction in hours as an increase in wages.

For other than train and engine forces, that is, shop forces, maintenance of way forces, and clerical forces, the eight-hour day was made effective by the Government in 1918, soon after the railways were placed under Government control for the purposes of the war. At the same time, wages were increased more than enough to offset the reduction in hours, except in the case of the higher-paid members of the railway staffs.

Following the war, the principle of the eight-hour day in shops, in maintenance of way work, and in the clerical offices was generally recognised, either by agreements between managements and employees, or by decisions rendered by the Railroad Labour Board, which was created by law in 1920. At the same time, the employees have retained a considerable proportion of the wage increases made during the war.

The economic effect of the institution of the eight-hour day on American railways may be summarised by comparing certain statistics for the year 1916 with corresponding statistics for the year 1924. The year 1916, it will be recalled, was the final year before the effective date of the law above referred to. The year 1924 is the latest complete year of railway operation. The comparison is here presented from two points of view : that of the employees, and that of the managements.

From the employees' point of view :

Hours per week have been reduced from 60.6 hours in 1916 to 48.3 hours in 1924. The 48-hour week has been, in effect, realised,

Compensation per hour has increased 126 %, that is to say, more than double.

Annual compensation, or earnings, have increased 81 %. In this connection, it will be recalled that the cost of living has increased about 65 %.

These averages apply to all railway employees, and indicate a satisfactory situation from their point of view. With fewer hours of labour, their total earnings per man have increased at a greater rate than the cost of living.

From the point of view of railway managements :

The number of employees on the payroll increased at a slightly higher rate than the traffic handled. From 1916 to 1924, the number of employees increased about 7 %, and the freight and passenger traffic about 5 %.

The larger traffic was handled with a considerable reduction in hours, indicating that more traffic per hour was handled in 1924 than in 1916. This result was attained largely by increasing the size of engines and cars, and by loading trains and cars more heavily;

Although fewer hours were paid for in 1924 than in 1916, the rate per hour was 126 % greater in 1924 than in 1916, and the total amount paid in wages was nearly 100 % greater.

In brief, while the railways in 1924 handled an increase of traffic with fewer hours of labour, those fewer hours cost them nearly twice as much as the greater number of hours of 1916.

Present situation.

A serious problem in the United States is that relating to the stabilisation of railway labour, that is, the problem of supplying continuous and permanent employment to the greatest possible degree.

The American railways are confronted with two difficulties in this connection. The first is climatic, due to the fact that in many sections (especially in the north) our severe winters make it impossible to carry on maintenance of way

during several months in each year. The second is the sharp variation in freight and passenger traffic from month to month, which affects both the train forces and the forces in the repair shops. Our traffic in October is often twice as great as in February, and changes occur upward or downward with great rapidity.

As to climatic difficulties, little can be done, although some northern lines have recently experimented with track work in winter, and have been able to spread that work more evenly through the year.

As to traffic variations, there is only one effective remedy, which is to maintain a uniform force of employees, and to vary their hours per day or per week in correspondence with the traffic. Thus, the same men might work only six hours per day during certain months of the year, eight hours during certain months, and ten hours during certain months, averaging eight hours for the year as a whole. A sliding scale of hours has actually been adopted on a few railways, but is opposed by the trade unions wherever their strength in numbers is sufficient to make itself felt. The unions sometimes agree to a forty-hour week, made up of five days of eight hours; seldom, if ever, do they agree to a shorter day than eight hours, although in effect there is little difference between three days of eight hours each, or four days of six hours each.

Summary.

I. — Since 1916 the eight-hour day has in a large degree been realised on the railways of the United States. Generally speaking, overtime pay at a higher rate is granted for all time over eight hours.

II. — The result has been beneficial to the employees, but has added very greatly to the cost of railway operation.

III. — The problems of stabilising railway employment is made difficult by climatic variations, by variations in traffic from month to month, and by the opposition of trade unions to a sliding scale of hours in the repair shops.

The President then referred to the resolution drawn up yesterday afternoon by Sir Evelyn Cecil (which appeared in yesterday's *Daily Journal*) and explained that this had now been somewhat amended. He then read the amended resolution and invited discussion thereon.

Mr. Soulez (*reporter*) referred to the various difficulties in the application of the eight-hour day in respect of conditions of service, weather, etc., and suggested certain alterations in Sir Evelyn Cecil's amendment.

Mr. Silva was also in favour of amending Sir Evelyn Cecil's draft.

Mr. Mason was of opinion that the strict application of the eight-hour day was impracticable so far as his country was concerned, and desired that in the general amendment the word « principle », which had been introduced into Sir Evelyn Cecil's amended draft, should be deleted.

Mr. Hill supported the opinion of the previous speaker.

Sir Evelyn Cecil saw no objection to the dropping of the word « principle ».

Mr. de Ruffi de Pontevès (*French Government*) stated that the Washington Convention does not lay down any regulations as rigid as the text submitted by Sir Evelyn Cecil seemed to imply. The regulations of this Convention which are already applied in France are, on the contrary, sufficiently elastic to be adapted to the varying conditions which may occur in different industries, and especially that of railways.

Mr. BARLOW stated that the terms of the Washington Convention had been more rigidly interpreted in England than in France and several other countries.

Mr. GUFFLET (*Midi Railway, France*) was of the opinion that all reference to the Washington Convention should be left out, and that it would be better if the resolution were drawn up in general terms only.

Mr. MEREUTZA (*Roumanian State Railways*) agreed with the previous speaker.

Sir Evelyn CECIL thereupon agreed to the reference to the Washington Conference being dropped.

Mr. SILVA and Mr. COLENS (*Belgian State Railways*), raised some further points on the amendment, and the discussion then having become general, the PRESIDENT stated that, in order to make the issue more clear, four separate amendments having been handed in, the meeting would be suspended for ten minutes in order that the secretaries might make the necessary translations.

On the resumption of the proceedings, the PRESIDENT stated that three of the authors of the amendments had agreed to a common text, and that it therefore only remained to vote on two resolutions, as under :

1) *Sir Evelyn Cecil's resolution.*

« That section IV is of opinion, after full statements by the representatives of the different countries, that a rigid eight-hour day is not practicable owing to varying local conditions and requirements but that each case should be examined with due regard to surrounding circumstances, and taking into consideration the special character of the railway work to be executed. »

2) *The resolution agreed to by the three Delegates.*

« Section IV, taking into consideration the information given by the representatives of the different countries, is of opinion that the application of the eight-hour day to railways makes it imperative to take into account the special local or technical necessities in each case.

« The section draws attention more particularly to the necessity :

« 1) Of not confusing hours on duty with actual work, while at the same time being careful to limit reasonably the length of hours on duty on any one day;

« 2) Of spreading over a sufficiently lengthy period the compensating number of hours off duty in order to strike the average of an eight-hour day, with a limited number of overtime hours;

« 3) Of increasing the individual output of work, more especially by a development of mechanical appliances, and in certain circumstances by avoiding excessive specialisation in labour. »

The meeting was then adjourned till Thursday morning, the PRESIDENT explaining that one hour would be devoted to a further discussion of these two resolutions, the vote to be taken at the expiration of that time.

Meeting on 25 June.

THE PRESIDENT, Dr. J. H. Parmelee (*Director of the Bureau of Economics, American Railway Association*) referring to the decisions arrived at in the course of the previous meeting, stated that one hour would be devoted to the final discussion of the two draft resolutions which had been submitted to the section.

These drafts were then read.

Sir Evelyn CECIL pointed out that there was really very little difference between the two resolutions, and suggested that a common text might be agreed upon.

He, however, expressed the opinion that paragraph 2 of the alternative resolution could not be accepted by the British delegates and some of their foreign colleagues, as it was contrary to certain agreements made with the unions.

Mr. COLSON (*French Government*) stated the reasons which induced certain delegates to accept the first paragraph of the alternative resolution as the first paragraph of the final resolution. He considers, in fact, that the text of the resolution, as proposed by Sir Evelyn Cecil, condemns outright the principle of the eight-hour day, a principle which has been accepted by the majority of countries. He would prefer to have it made clear that only the method of application of the principle came into question.

Sir Evelyn CECIL feared that he had been misunderstood. It was not his intention to condemn the principle of the eight-hour day, and he considered that a slight alteration of the French translation would help to make his meaning much more clear. The alteration which he suggested was : « Section IV ... is of opinion that a rigid application of the eight-hour day is not possible. »

THE PRESIDENT then proposed to the section that they should vote by a show of hands on the adoption of Sir Evelyn Cecil's resolution, as altered, as the first paragraph of the final resolution.

Ninety votes were cast in favour of this proposal and 35 in favour of the adoption of the first paragraph of the second draft as the first paragraph of the final resolution.

The resolution of Sir Evelyn Cecil was therefore adopted as the first paragraph of the final resolution.

The discussion of the first and third paragraphs of the alternative resolution was then proceeded with, leaving the second paragraph to be discussed later.

Mr. GIL CLEMENTE (*Spanish Government*) suggested that the resolution be limited to the text already voted upon.

Mr. HILL suggested an alteration in paragraph 1.

Finally, the paragraph was adopted as it stood.

Mr. COLSON informed the President that he and his colleagues would not insist on the inclusion of No. 3 of the alternative draft in the final resolution.

Passing on to the discussion of No. 2 of the alternative draft, the PRESIDENT pointed out that the purport of that paragraph had not been made sufficiently clear for certain of the English-speaking delegates.

Mr. COLSON emphasized the meaning to be given to the said paragraph. Its intention was to permit of the application of the principle of the eight-hour day, taking into account the requirements of railway working, and making it possible for a workman to be on duty for eight hours or more whilst spreading his average number of working hours over a sufficiently lengthy period.

Mr. A. WILSON (*London & North Eastern Railway*) suggested that, in order to meet the difficulties presented by the adoption of the paragraph under consideration, it might be modified as follows : « of spreading over a sufficiently lengthy period the compensating number of hours of duty. »

THE PRESIDENT then suggested that the following might be added : « as the special circumstances of the several countries permit. »

Mr. H. E. WILLIAMS (*Eastern Bengal Railway, British India*) stated that he was opposed to the adoption of that paragraph.

Mr. EPINAY (*Paris-Orleans Railway*), pointed out that the paragraph in question was simply a summary of the report presented by Dr. Parmelee on the effect of the eight-hour day on the American railways.

Mr. GRAHAM (*Great Indian Peninsula Railway*) requested that, as time was getting short, the Section should proceed to vote.

This was acted upon, and the adoption of the last paragraph was carried by 55 votes in favour and 44 against.

The final resolution therefore takes the following form :

Final summary.

« 1. — That the Congress is of opinion, « after full statements by the representa- « tives of the different countries, that a « rigid eight-hour day is not practicable « owing to the varying local conditions « and requirements, but that each case « should be examined with due regard to « surrounding circumstances and taking « into consideration the special character « of the work to be executed.

« 2. — The Congress draws attention « more particularly to the necessity :

« *a*) Of not confusing hours on duty « with actual work, while at the same « time being careful to limit reasonably « the length of hours of duty on any « one day.

« *b*) Of spreading over a sufficiently « lengthy period the compensating num- « ber of hours of duty in order to strike « the average of an eight-hour day with « a limited number of overtime hours, as « the special circumstances of the several « countries permit. »

— The General Meeting ratified this final summary at its meeting on the 27 June.

QUESTION XI.

Statistics.

Development of railway statistics with the special view of economy in operation.

Preliminary documents.

1st report (all countries, except America), by Mr. A. E. KIRKUS. (See English edition of the *Bulletin*, November 1924, p. 947, or separate issue [with red cover] No. 6.)

2nd report (America), by Colonel J. T. LOREE. (See English edition of the *Bulletin*, May 1925 [1st part], p. 1465, or separate issue [with red cover] No. 37.)

Special reporter : Mr. A. E. KIRKUS. (See English edition of the *Bulletin*, June 1925, p. 2142.)

Report of the 4th section.

(See *Daily Journal of the session*, No. 4, p. 6 and No. 5, p. 7.)

THE PRESIDENT drew the attention of the delegates to the fact that the question was limited by the words « with a view to economy in operation ».

He then called upon Mr. KIRKUS, the special reporter, to read a summary of his own report, covering all countries

except America, and of that of Colonel Loree, relating exclusively to America.

The President then asked Colonel Loree whether he had any supplementary remarks to offer.

Colonel Loree stated that since his report had been printed, the Interstate Commerce Commission had been considering a scheme, which if adopted would appreciably modify the present system of statistics. The nature of this scheme was still somewhat vague, but it might be taken as certain that the modifications contemplated would be introduced within the next twelve months.

Mr. Giovene (*Italian State Railways*), considered that the reporter had not made it sufficiently clear that the Italian State Railways compiled other statistics in addition to monthly and annual statistics.

He went on to refer to a point raised by Mr. Kirkus as to differences in the bases adopted, which differences rendered any comparison difficult. He remarked that the International Railway Union was at present studying this question, and he thought that section IV, while not actually dealing with the particular question of international statistics, should at least express the hope (which he suggested should be included in the final resolution of the section) that the International Railway Union should make every endeavour to lay the foundation of a practical solution.

Mr. Edwards (*London & North Eastern Railway*), emphasized the importance of the basis in the utilisation of statistics. It was above all essential that the statistics should be regarded with confidence by those to whom they were supplied. Two objections were frequently made to statistics : firstly, that they were costly to compile; and, secondly, that they did not represent the facts, because of the absence of uniformity of basis.

He explained that in England, in conformity with the Railway Act of 1924, all the statistics required were first considered by the Railway Statistical Committee, who, after consultation with the officers concerned, laid down precise instructions as to their compilation. He emphasized the difference between transitory and permanent statistics (the latter as required by law), and said that transitory statistics should be examined at least once a year to see whether their continuance was necessary.

Dr. Wang (*Chinese Government*) stated that in China no really satisfactory statistics had been compiled before 1912, in which year, after consultation with the experts of many countries, an excellent system of statistics had been evolved. Copies of the annual statistical report were at the disposal of such delegates as desired them.

Mr. Van Wassenaar (*Central Argentine Railway*), also emphasized the difficulty which arose in the comparison of statistics through the absence of a uniform basis.

Mr. Lamalle (*Belgian State Railways*) called attention to three points which in his opinion deserved special consideration, *viz* :

1) Rotation of wagons (*i. e.*, average time elapsing between successive loadings of each wagon), which he said was five days in Belgium;

2) Average load per wagon, a factor of value in fixing charges and in inducing traders to give a greater load per wagon;

3) The adoption of the metric system for a uniform international basis.

Mr. Teixeira (*Portuguese State Railways*) supported the view of Mr. Lamalle with regard to the adoption of the metric system as an international basis, and requested that this should be embodied in the final resolution to be adopted by section IV.

The President then summarised the discussion as under :

It is generally agreed that without exact and specially compiled statistical information, railway operating officials are unable to ascertain where and how economy in operation may be effected.

The problem consists, therefore, in determining the kind of statistics to be compiled, the extent to which details shall be developed, and the intervals at which reports are to be made. Clearly, local conditions must largely govern the solution of this problem, and no uniform rules can be laid down with regard to the statistics to be compiled in any particular country or on any particular line.

It is also obvious that the demands of economy require that statistical work on the railways shall always be a means to more efficient operation, and not an end in itself.

Statistics should not be made so detailed, nor entail such expense, as to increase rather than diminish the cost of operation.

In view of these general considerations, the following resolution is submitted :

« Section IV, having considered the character and extent of statistical work on the railways throughout the countries of the world, submits the following general principles :

Final summary.

« 1) That accurate statistics of railway « operation are of the utmost importance « for increasing railway efficiency and « economy;

« 2) That statistics must be regarded « not as an end in themselves, but as a « means of increasing the efficiency of « the railway service, with a view to « making the cost of the service as low as « possible to the user, and as remunera- « tive as possible to railway owners;

« 3) That with due regard to local « conditions in each case, the expense of « compiling statistics should not be per- « mitted to become an undue burden on « the cost of railway operation;

« 4) That the continuation of the « efforts already made — and amongst « them those of the International Rail- « way Union — to standardise the collec- « tion and compilation of statistics in all « countries is desirable;

« 5) That it is further desirable that « standard units be adopted for use in « the compilation of statistics, to the end « that truer comparisons may be possible « between the statistics of different com- « panies and different countries. »

Mr. Lamalle thought that the resolution submitted by the President expressed the general feeling of the section, and proposed that it be adopted *en bloc*, subject to verbal alterations, if necessary, after it had appeared in the *Daily Journal*.

Mr. Mereutza (*Roumanian State Railways*) stated that he was in agreement with Mr. Lamalle provided that the President's summary was embodied in the resolution.

The members of Section IV unanimously adopted the terms of the above resolution including, as preamble, the President's summary.

— The General Meeting ratified this

final summary at its meeting on the 27 June.

QUESTION XII.

Joint stations and lines.

Allocating the cost of joint stations and lines between several railway administrations.

Preliminary documents.

1st report (France), by Messrs. COLLOT and BRUNEAU. (See English edition of the *Bulletin*, January 1925, p. 119, or separate issue [with red cover] No. 14.)

2nd report (all countries, except America, the British Empire, France, China and Japan), by Mr. U. LAMALLE. (See English edition of the *Bulletin*, February 1925, p. 571, or separate issue [with red cover] No. 22.)

3rd report (America and the British Empire), by Mr. R. COPE. (See English edition of the *Bulletin*, January 1925, p. 140, or separate issue [with red cover] No. 14.)

4th report (China and Japan), by Mr. J. MURAI. (See English edition of the *Bulletin*, January 1925, p. 151, or separate issue [with red cover] No. 14.)

Special reporter : Mr. R. COPE. (See English edition of the *Bulletin*, June 1925, p. 2149.)

Report of sections III and IV combined.

(See *Daily Journal of the session*, No. 5. p. 6.)

Dr. PARMELEE, President of the Section IV, took the chair at the combined meeting, on the demand of Mr. DU CASTEL, President of Section III, who was unable to be present.

Dr. PARMELEE reminded the delegates that the question had formed the subject of four reports prepared by Messrs. Collot and Bruneau for France, Mr. Murai for Japan and China, Mr. Cope for America and the British Empire, and Mr. Lamalle for the other countries.

The special report, embodying the above four reports, had been prepared by Mr. Cope, whose place as reporter was taken by Mr. Dashwood, he himself being unable to be present.

Mr. DASHWOOD proceeded to read Mr. Cope's special report.

On the conclusion of the reading of the report, the PRESIDENT thanked Mr. Dashwood, and after remarking that the subject had been thoroughly investigated by Mr. Cope and the other reporters, he declared the question open for discussion.

Mr. ITO (*Japanese Government*) after stating that he acted in place of Mr. Murai, who had left the service, read a report in which he drew the attention of the meeting to the special circumstances affecting joint stations in Japan.

Mr. GRAHAM (*Great Indian Peninsula Railway*) proposed that the last two paragraphs given in Mr. Cope's summary should be adopted, these being worded as follows :

« It will be noticed from the reports that although the principles governing the division of joint expenses are, on broad lines, the same in every country, yet owing to variation due to certain local factors, it has not been found possible to standardise either the agreements or the method of apportioning the expenses,

and, as the circumstances vary at almost every place, the method of apportionment adopted is the one which has been found, upon investigation, to be the most equitable.

« The basis of a joint arrangement is to insure that the expenditure is equitably apportioned and where the value of the work for one interest cannot be fairly determined by a division on the basis of numbers of passengers or tonnages alone, the numbers of trains or goods vehicles are frequently introduced. As each settlement is dealt with on the merits of the particular case, it is not possible to say that any method of apportionment has an advantage over the others. On the other hand, these variations have been accepted by all parties concerned as being fair and equitable. »

Mr. LAMALLE wished to draw a distinction between the principles alluded to in the first paragraph and local factors.

Mr. COLLOT (*reporter*) agreed with Mr. Graham. There was, he said, no question of principle, but of agreements between the two parties, and it was therefore difficult to recommend any particular system.

Mr. COATES (*Oudh and Rohilkhand Railway*) said that in India joint stations were frequently a cause of disagreements between companies and he suggested that the meeting should lay down certain general principles, on the understanding that account should be taken of local conditions.

Dr. WANG (*Chinese Government*) supported the proposal of Mr. Graham that the two last paragraphs of Mr. Cope's summary should be adopted, but he asked that the two preceding paragraphs should be added.

Mr. COATES proposed the following resolution :

« Sections III and IV recommend the universal adoption of basic principles regarding the sharing of the working costs of joint stations, these principles to take account of the different costs of transit traffic, interchange traffic, and local traffic, the Companies interested in the various joint junctions and stations making any alterations in these basic principles necessitated by local conditions. »

Mr. EBERHARDT (*Polish State Railways*) proposed that the question of settling the basis of the division of common expenses should be included in the Agenda for the next Congress. With that exception, he agreed to the proposal of Mr. Coates.

THE PRESIDENT informed the meeting that three resolutions were therefore before them, namely, the resolution of Mr. Graham, the resolution of Dr. Wang (these two as a matter of fact could be combined in one) and the resolution of Mr. Coates.

Dr. WANG remarked that these resolutions were, in fact, all based on the same principles. The question was therefore purely one of drawing up the text, and he proposed that this text should be referred to a small Committee consisting of the President and Messrs. Lamalle, Graham, Coates, Collot, Bruneau, Santini and himself.

THE PRESIDENT stated that he was himself about to suggest the same arrangement. Before, however, submitting it to the meeting he put the three resolutions, which had been proposed, to the vote.

1) Mr. Eberhardt's amendment (*i. e.*, that the matter should be referred to a

subsequent Congress) — votes for : 3 only; the amendment was therefore rejected;

2) Mr. Coates — votes for : 13, against : 23. The amendment was therefore rejected;

3) Messrs. Graham and Wang — carried unanimously.

THE PRESIDENT then declared the sitting suspended for half an hour to allow the Committee to draw up the final text of the resolution proposed.

When the sitting was resumed the PRESIDENT read the following text, composed by the Committee appointed by the Sections, and this was definitely adopted as the text of the final summary.

After a discussion on question XII : « Joint stations and lines » sections III and IV combined put forward the following final summary :

Final summary.

« Every joint arrangement is based on « the measures that are necessary to « ensure expenses being equitably di- « vided, but differences arising from « certain local factors prevent uniformity « of methods for the division of expenses.

« It is consequently impossible to say « that any one method has any advantage « over others.

« With the exception of special cases « where agreement has been reached for « a fixed annual payment, an endeavour « should be made to determine the value « of the work done for each of the in- « terested parties. When this estimate « cannot be made with sufficient exacti- « tude to admit of a division based only « on the number of passengers or ton- « nage, the number of trains, axles, or « other elements may be introduced. It « is sometimes possible to limit these « elements to a given period and to adopt « the results obtained as the fixed pro- « portion for the division of the expenses, « with the option of revising this propor- « tion periodically if circumstances seem « to require it. »

— The General Meeting ratified this final summary at the meeting held on the 1 July 1925.

SECTION V.

Light railways and colonial railways.

President : G. SEMENZA.

Vice-presidents : T. BALS, H. CAUFRIEZ, F. PICK and F. P. TEIXEIRA.

Principal secretary : E. BELPAIRE.

QUESTION XIII.

Establishment of light railways.

Methods of establishing light railways or lines for developing new countries. (Laying-out, gradients, standard gauge, narrow gauge, etc.).

Preliminary documents.

1st report (America and the British Empire), by Mr. H. MARRIOTT. (See English edition of the *Bulletin*, October 1924, p. 847, or separate issue [with red cover] No. 3.)

2nd report (all countries, except America, the British Empire, China and Japan), by Mr. BONNEAU. (See English edition of the *Bulletin*, October 1924, p. 873, or separate issue [with red cover] No. 3.)

Special reporter : Mr. H. MARRIOTT. (See English edition of the *Bulletin*, June 1925, p. 2152.)

Report of the 5th section.

(See *Daily Journal of the session*, No. 2, p. 8, No. 3, p. 10 and No. 4, p. 6.)

THE PRESIDENT took the chair and called upon Mr. Marriott (*special reporter*), who read a summary of his report on « The methods of establishing Light Railways or Lines for developing new countries » (1).

THE PRESIDENT then opened the discussion on the report.

Mr. F. LEVEL (*Local Railways, France*) was of opinion that the construction of light railways had not been carried out on a sufficiently large scale, and that, in consequence, the majority of such railways were suffering as a result of errors committed forty years ago. He was of opinion that in opening up new countries a gauge of 1 m. (3 ft. 3 3/8 in.) was preferable to that of 60 cm. (2 feet).

The 60 cm. gauge had given very excellent results during the war, but at that time conditions were very different.

The metre-gauge railway permitted the transport of heavy loads, and, as an instance, a metre-gauge railway with rails 20 kgr. to the metre (40.3 lb. per yard), constructed forty years ago, was cited as having carried trains of 400 tons with a locomotive weighing 42 tons light with five coupled axles. He was of opinion that such results could not be obtained with the Decauville track. He doubted whether it was prudent to make a class of light railways based on the maximum speed allowed. This might lead to difficulties with the control services.

Mr. TEIXEIRA (*Portuguese State Railways*) insisted that a line of difference should be drawn between light railways

(1) This summary appeared in the *Bulletin of the International Railway Congress*, June 1925, p. 2152.

and pioneer railways, and that speed should be the discriminating factor. Speed was of great importance with regard to the construction of lines, and also with regard to cost.

He gave examples of Portuguese Colonial railways with a 3 ft. 6 in. gauge (1.067 m.) on which it had been possible to effect hauls equivalent to those on the European normal-gauge railways.

Furthermore, the result to be obtained is not the same in both cases. Whereas in Europe light railways are constructed for the purpose of establishing connection between neighbouring localities, in the colonies these railways join up districts of considerable distance apart.

Another difference is that in Europe the lay-out has to be of a definite nature from the outset, whereas in the colonies it is often necessary to make alterations in the lay-out when the line is actually in working in order to assist the development of new industries.

A last and important point to be noted is that pioneer lines in new countries are closely related to the question of port development because the main object is to enable the produce from the interior to be brought out with a view to its exportation.

Mr. De Benedetti (*Italian State Railways*) was of opinion that the question of pioneer lines should embrace those lines carrying a considerable traffic (which are, therefore, the principal lines), and the secondary lines, or light railways, those which are the feeder lines of the principal lines. The question of gauge should be treated separately in the two cases.

Mr. F. Level stated that the discussion was deviating from the point at issue. At previous conferences it had not been possible to define exactly what constituted a light railway, and, moreover, it was only of theoretical importance. Consideration should be given to the faults committed in the laying out of light railways in order to avoid a repetition of errors in the construction of lines for opening up new countries.

Mr. de Souza (*Portuguese Government*) asked that too fine a distinction be not drawn. In his opinion there were two categories only :

1) Principal lines;
2) Secondary lines of more or less importance.

So far as concerned the latter lines should provide for the future in such manner as not to render it impossible to convert them ultimately into principal lines.

The President pointed out the difference of interpretation which the various speakers were placing on the question.

Mr. F. Level referred to what had been said at the Rome Congress, and in particular reminded the delegates of what had been put forward by Mr. Tajani on that occasion. It was purely a question of studying methods for establishing pioneer lines in new countries.

The President then consulted the delegates on the point so as to know whether it is their desire to deal with light railways first and then treat of colonial railways, or whether they wish to discuss the question of pioneer railways in new countries.

Mr. Gevaert (*Belgian National Light Railways*) took exception to the observation with regard to « errors committed » referred to by Mr. Level *à propos* the

establishment of pioneer lines in the colonies.

He drew attention to the case of the first line to be laid down in the Belgian Congo.

Although latterly it may not have given full results, there can be no question of attributing this to the organisers of this undertaking or to the organisation itself. It is only during the development of the traffic that one is led to improve existing lines.

There can, therefore, be no question of errors committed at the outset.

Mr. F. Level stated that he had no wish whatever to speak of errors made in the colonies, but of those made in Europe. He was in accord with Mr. Gevaert.

Mr. Thonet (*Tramways of Lombardy and Emilia* [*Romagna*], *Italy*) proposed that the discussion be closed, and that it be stated that the pioneer lines should be of economical construction, although sufficiently durable material should be employed, notably six-bolt fish-plates.

Mr. Marriott (*special reporter*) mentioned that in the replies which he had received a distinction was generally made between light and pioneer railways. He thought it would be as well to define at the beginning of this discussion what was understood in each case. However, he did not insist upon this point.

The President asked the delegates whether it was desired to discuss the whole question of light railways or whether the discussion should be limited to the question of pioneer lines in new countries.

General Mance (*Permanent Commission*) was of opinion that in the construction of pioneer lines it is necessary to establish the road-bed in such a manner as to render possible the ultimate conversion into a principal line, while the permanent way might in the first instance be of a more economical nature.

The President proposed to divide the question clearly as between pioneer lines and light railways in general, and to keep to the former.

Mr. de Souza asked that general principles be fixed for the establishment of secondary lines, the latter being more or less applicable to Colonial railways.

Mr. F. Level stated that the question which it had been desired to discuss had not been entered into. It had not even been reported upon. He reminded the section that the question set forth at the Rome Congress, referred solely to advice to be given for the establishment of pioneer lines in new countries. He called special attention to these last words.

The President called attention to the difference which existed between the English and French wording of the question. He thought that the confusion arose from that difference.

Prof. Tajani (*Federation of Transport, Italy*) as late chairman of the 5th section, was in accord with Mr. Level. He asked that the question of Colonial lines be studied because that concerning light railways had already been sufficiently examined at previous sessions. Reference had been made to principal lines in the Colonies, but such lines were an exception. In the Colonies there are only light railways. He considered it necessary to advise the Congress as to what methods should be adopted for the establishment of light railways in new countries.

THE PRESIDENT, in conclusion, asked Professor Tajani to confine the discussion to pioneer railways without, however, abandoning certain questions referring to light railways in general. He proposed, therefore, to refer again to the questions already touched upon in regard to gauge and speed.

Mr. DE BENEDETTI asked that the choice of gauge be left to the discretion of the different countries. He stated that Italy had gauges between 95 cm. and 1 m. The latter gauge was preferable as it permitted the adaptation of the line to be progressive with the development of traffic.

Mr. VAN LEEUW (*Belgian Government*) stated that the question of gauge depends upon the country in which the line is established. In the Katanga (Belgian Congo), the companies have been obliged to adopt the 1.067 m. gauge in order to be able to connect their system to that of South Africa. Moreover, the cost of construction of the railway of this gauge is too heavy. In many cases these lines may cease to exist on account of the ravages of sleepy sickness among the population. He was, therefore, of opinion that the most economical railway for these temporary lines is that of a 60 cm. gauge, but even for these lines sharp curves and steep gradients should be avoided. At present such a line costs about 60 000 francs (£600) per kilometre.

Prof. TAJANI was of opinion that it was not possible to exclude gauges under 1 m., especially for Colonial railways, but the object of the Congress being to make known what has already been carried out, a gauge of 1 metre, or approximately 1 m., should be advocated. At the same time it should be mentioned that a 60 cm. gauge in the Colonies has given good results.

Mr. VAN LEEUW called the attention of the Congress to the disadvantage which would result from not adopting a uniform gauge on the various lines in Central Africa. He mentioned the numerous gauges at present in existence in the Congo and in the English and French Colonies. The Congress should express the opinion that, at least in Central Africa, one gauge only should be adopted.

Mr. TEIXEIRA gave the reasons for which the gauges of 1.067 m. and 60 cm. have been adopted, according to requirements, in the Portuguese Colonies, the first being reserved for lines carrying heavy traffic, while the second is employed for lines serving poor and desert areas. Sharp curves and steep gradients should, however, be avoided.

THE PRESIDENT called attention to the proposal made in the morning by Prof. Tajani.

Prof. TAJANI stated that he wished to make an amendment with regard to the observations he had made. Whilst advocating the gauge of 1 m., or approximately 1 m., he had noticed that, in certain cases, smaller gauges down to a minimum of 60 cm. had been adopted. He added that it is desirable to adopt a uniform gauge in particular geographical regions.

Mr. VAN LEEUW was of opinion that there should be two gauges : 1.067 m. for the principal lines and 60 cm. for the secondary lines.

Mr. LAUNAY (*French West African Railways*) seconded the proposal of Mr. Teixeira, *i. e.*, that a gauge of 1 m. be adopted for the lines carrying a considerable traffic and 60 cm. for secondary lines.

He stated that he was also in favour of

the adoption of one gauge only for a particular region.

Mr. F. Level stated that it is certain that standardisation is desirable, but that the Congress was not required to give an opinion on this point. It should limit itself to recommending a gauge of 1 m., or approximately 1 m. He proposed a resolution to this effect.

A discussion arose in regard to the proposal of Mr. F. Level in which the following delegates took part : Messrs. Launay, Van Leeuw, Gillet (*Lower Congo-Katanga Railway*) and De Benedetti.

The President offered to prepare for the section a definite text of a resolution upon which the section could vote at the next day's meeting.

— This proposal was adopted.

The President asked the delegates who had spoken on standardisation also to prepare the text of a resolution which would be submitted for discussion at the same meeting.

He then proceeded to open a discussion on the question of the speed to be adopted on light railways.

Mr. F. Level, in calling attention to the liberty which light railways enjoy in France, asked that no rule be established in regard to this point. He pointed out the danger there would be in acting otherwise, as the authorities could thus impose restrictions which would be detrimental to working.

Mr. Marriott (*special reporter*) explained that he had dealt with this question of speed because it had already been considered by the « Light Railways Investigation Committee », this Committee having had in view particularly the limitation of speed in order to reduce first cost in the establishment of light railways, these costs being, in fact, dependent upon the speed which would be required on the lines to be constructed.

The President remarked that Mr. Marriott spoke of light railways in Great Britain. The conditions in that country are different from those of the pioneer lines referred to by Mr. F. Level.

Mr. Thonet, for the Italian Light Railways, and Mr. Jacobs, for the Belgian Light Railways, strongly supported the opinion of Mr. F. Level.

The President stated that the section was agreed that no desire should be expressed in regard to the question of speed regulation and declared the meeting closed at 4.30 p. m.

On the following day the President read the draft resolution in regard to the question of gauges, which was based on the various opinions given during the previous meeting.

Mr. Gillet proposed an amendment to the effect that the adoption of curves of large radius should not lead to increased cost, which would remove the advantages expected to be derived from the use of the 60 cm. gauge.

Mr. F. Level had no objection in principle, but proposed that the following should be added : « As far as practically possible having regard to the funds available ».

Mr. Van Leeuw remarked that the 60 cm. gauge does not permit steeper gradients, but does permit smaller curves. After a discussion, in which Messrs. Gillet, De Benedetti and Van Leeuw took part, the following text was unanimously adopted :

« Whilst recognising that gauges less

than 1 m. have been employed in several countries, and have given good results, the Congress is of opinion that for pioneer railways in new countries, a gauge of about 1 m. is to be recommended.

« In cases where special conditions call for the adoption of a smaller gauge, that of 60 cm. is advocated, but at the same time curves of larger radius than those which are possible with that gauge should be adopted as far as practically possible with the financial means available. It is to be recommended that gradients be reduced to a strict minimum compatible with local conditions. »

THE PRESIDENT asked whether the delegates who had spoken in favour of standardisation had prepared a text on this subject.

Mr. LAUNAY stated that he had prepared a text, which was read and submitted for discussion.

Mr. F. LEVEL stated that he thought that a uniform gauge in each district was to be recommended.

Mr. BELPAIRE (*principal secretary*) remarked that Mr. Launay had stated at the previous sitting that generally two gauges were used in each district, one for principal lines and another of a smaller gauge for the feeder lines.

Mr. VAN LEEUW called attention to the interest which would be derived from an agreement between neighbouring countries with regard to gauges.

Prof. TAJANI was of the same opinion and proposed that the different countries should come to an agreement for the adoption of a uniform gauge in the same geographical region.

Mr. TEIXEIRA shared this view, and supported it by references to the division of European possessions in Africa. The coastal districts are generally in the hands of a nation other than those possessing the inland territory. The result is that if the gauges are different, direct conveyance between the inland territories and the ports is not possible.

Mr. F. LEVEL asked whether the Congress was qualified to pass a resolution of this kind. As regards pioneer railways the desires of the respective Governments are not known. It would be dangerous to give an opinion which might be contrary to those views.

Mr. GEVAERT was not in accord with Mr. Level. He stated that the Congress was not a diplomatic assembly, but was constituted solely for the purpose of discussing technical and commercial points. A resolution of the kind proposed could, therefore, be approved. Governments could decide for themselves how far such proposals might be carried out.

Mr. DE SOUZA supported the views of Mr. Teixeira by means of examples in the Portuguese Colonies. He mentioned the disadvantages resulting from the existence of different gauges.

The first text drawn up in general terms had his complete approval.

Mr. DE BENEDETTI said that the political side of the question referred to by Mr. Level had not prevented inter-communication between the large European systems, although their importance was far greater than that of light railways in the Colonies. He saw no necessity for taking such points into consideration.

Major GRIFFIN (*Iraq State Railways*) stated that up to the present the question

of gauge only had been discussed, but that for intercommunication it was also necessary to come to an agreement in regard to the standardisation of other elements, such as loading gauges, couplings, height of buffers, etc. The resolution, he maintained, should also take account of these.

Messrs. OTTONE (*Federation of Transport, Italy*) and MELLINI (*Sardinian Secondary Railways*) called attention to the importance of adopting a uniform gauge from a technical and commercial standpoint.

After a discussion between Messrs. THONET and F. LEVEL, the PRESIDENT stated that he was in posession of several proposed texts for the resolution, and asked, in consequence, that the authors of these should come to an agreement on a final text to be submitted to the section.

Mr. MARRIOTT (*special reporter*) considered that point No. 4 of the summary of his report relating to Decauville and road-rail systems used in some Colonies should be discussed.

With regard to a question raised by Mr. BEAU (*Réunion Railway*), Mr. MARRIOTT pointed out that he could accept no responsibility for the views given with regard to « road-rail » systems and others. He had merely been desirous of drawing attention to opinions which he had received.

Major-General Sir H. P. E. FREELAND (*Bombay, Baroda and Central India Railway*) read a very interesting note on this question, which will be published in full in the *Bulletin of the Congress*.

The chief points were :

Great difficulties had been experienced in India in opening up new country for the purpose of bringing new traffic to the existing railways. Unless the costs of labour and materials were appreciably reduced, the success of such enterprises would be uncertain, although the unworked riches of the interior made the creation of many branch lines indispensable. It was necessary to discover a standard of railway construction and equipment which, while improving on the bullock cart in the matter of speed and reliability, distance hauled, and cost of transport, would be sufficiently cheap in installation and operation to provide a reasonable return on capital.

For such lines the railway engineer had to sacrifice most of the works that he regarded as essential for a well designed railway.

The actual fact was that on such light railways these works had to be regarded as a luxury that could only be considered at the risk of jeopardizing the whole undertaking.

The colonization of new countries was essentially a question of men and transport, the colonists being assured that they could export the products they extracted from the soil. It was, therefore, necessary to give full attention to the question of transport in new countries.

The types of country to be taken into consideration could be put into two classes, namely :

1° The flat, open country, where a maximum gradient of 1 in 100 can be obtained without heavy cost, and where curves of 150-foot radius need not be exceeded;

and 2° the rough, semi-mountainous or undulating country, where, if heavy expenditure is to be avoided, grades up to 1 in 25 and curves as sharp as 50-foot radius must be used.

For the former he considered it debatable as to whether light Decauville railways, with their adhesion locomotive or tractors, or the road-rail system referred to by Mr. Marriott are the most suitable. For the latter there was, in

his opinion, not much doubt that the road-rail system promises best.

Some experience of construction costs had been obtained in India recently, where three road-rail lines had been sanctioned as feeders to the Bombay, Baroda, and Central India Railway. As compared with the estimated cost of broad gauge (*i. e.*, 5 ft. 6 in.) and metre gauge lines, leaving the rolling stock out of consideration, it was found in practice that the road-rails could be constructed in India at a cost of £1 400 per mile in difficult country, and at £1 100 per mile in easy country, as against £5 700 per mile for a light metre gauge line and £7 000 per mile for a light broad gauge line.

THE PRESIDENT read the draft paragraph that had been approved by the delegates relative to the question of standardisation :

« From the technical and the commercial points of view it is desirable that, in neighbouring countries the main and secondary pioneer railways, should adopt the same characteristics for their fixed installations and for their rolling stock. »

Mr. BALS (*Roumanian State Railways*) was of opinion that the characteristics should be enumerated and a distinction should be made between those which did and those which did not really affect the question of inter-communication.

THE PRESIDENT, however, considered that the resolution as it stood met the case of standardisation with respect to inter-communication. It was therefore put to the vote and was carried.

THE PRESIDENT made reference to the observations of General Freeland of which a summary in French and English had been published in the *Daily Journal of the Session.*

Mr. WATSON (*London & North Eastern Railway*) read the following proposal :

« During the sittings of the section and at a time considered by the President as being most appropriate, the following proposal might be submitted for consideration :

« That this section begs to call the attention of the Congress to an aspect of the Light Railway problem not embraced in the present reports, *viz.*, the question of how to handle small traffics or « light » traffics on branch railways of standard gauge already open where the traffic is not likely to increase and is not greater than could be handled on a light railway. Many of these branches are at present worked at a loss but it is impossible to close them. »

« They venture to suggest that a report dealing with this subject should be submitted to this section of the Congress. »

Mr. MARRIOTT said that as the question was not on the agenda and did not come within the scope of his report, he was sure he would have the support of Mr. Watson in suggesting that the question be relegated to the next Congress.

General MANCE thought that it might be dealt with after question XV. This was agreed.

THE PRESIDENT then thanked Mr. Marriott for his very enlightening report and acclaimed.

Mr. MARRIOTT briefly thanked the section for its kind appreciation and withdrew, owing to his presence being required elsewhere in his capacity as joint secretary.

THE PRESIDENT read the resolutions proposed by the section :

Final summary.

« While recognizing the fact that « gauges of less than 1 m. have been « adopted in many countries and have « given good results, the Congress is of « opinion that a gauge of about 1 m. is « to be recommended for pioneer rail- « ways in new countries.

« In cases in which special conditions « lead to the adoption of a narrower « gauge, the 60 cm. gauge is recommended « with curves of larger radius than the « minimum that can be used for this « gauge so far as the financial conditions « permit. It is also recommended that « the gradients be kept down to the strict « minimum compatible with the local « conditions.

« From the technical and the commer- « cial points of view it is desirable that « in neighbouring countries the main and « secondary pioneer railways should « adopt the same characteristics for their « fixed installations and for their rolling « stock. »

— This final summary was ratified by the general meeting the 27 June 1925.

QUESTION XIV.

Concessions for light railways.

Relations between the concessionnaires of light railways and the authorities granting the concession. Economic and financial administration.

Preliminary documents.

Report by Messrs. P. Biraghi and P. Lo Balbo. (See English edition of the *Bulletin*, April 1925, p. 951, or separate issue [with red cover] No. 31.)

Special reporter : Dr. P. Lo Balbo. (See English edition of the *Bulletin*, June 1925, p. 2155.)

Report of the 5th section.

(See *Daily Journal of the Session*, No. 4, p. 7.)

Mr. Lo Balbo (*reporter*) read a summary of his report on the conditions prevailing in the various countries regarding the relations between the conceding powers and the light railway concessionnaires.

The President thanked the reporters for their report and particularly for the clear manner in which they had drawn up the four paragraphs of their summary; he proposed to deal with these individually and asked the members to keep the discussion as brief as possible.

Mr. Navarro (*Portuguese Colonial State Railways*) said that he thought it might be of interest to the section to know that a new law had recently been adopted which gave to the Portuguese Light Railways the same facilities as are enjoyed by the Belgian Light Railways.

Mr. Ravenek (*Dutch Government*) said that he desired to correct certain observations contained in Mr. Lo Balbo's report relating to Holland. Effect had been given to certain laws of recent date which gave the same facilities to light railways as were afforded to the broad-gauge systems.

The President then invited discussion on the four points set out at the end of the summary on page 2156 of the *International Railway Congress Bulletin*, No. 7 of June 1925.

Mr. Beau (*Réunion Railway*) then stated that he considered the wording of point No. 1 as too categoric and suggested that the final phrase should read « financial aid on the part of the conceding powers is generally indispensable ».

A lengthy discussion then ensued, in which Messrs. Launay (*French West African Railways*), V. De Benedetti (*Italian Government*), Lo Balbo, Thonet (*Tramways of Lombardy & Emilia* [*Romagna*], *Italy*), Bouteau (*French Light Railways*), and F. Level (*French Local Railways*) took part, and the following text was proposed :

« For the construction and operation of light railways, financial aid on the part of the conceding powers is generally indispensable. »

Several members took part in a further discussion for and against the wording of the paragraph which was finally carried with two abstentions.

The President then opened the discussion on paragraph 2.

Mr. F. Level said that he found himself in complete accord with what had been said in Rome with regard to the eight hour day; he thought it wise to draw attention to the difficulties encountered in the application of the regulations, and he proposed the following wording :

« With regard to this, the Congress recalls the findings at Rome in 1922, showing the great differences existing between the working conditions on main lines and light railways, and that, therefore, these differences should receive the greatest consideration if the working of light railways and feeder lines were not to be rendered impossible. »

Mr. Debarsy (*Belgian National Light Railways*) was not unduly alarmed by the regulations relating to the eight-hour day, he recognized however that in their application some latitude was necessary in the interest of the service and of the public.

The addition proposed by Mr. F. Level was then adopted with a slight modification, paragraph 2 as finally amended reading :

« 2. The conditions of construction and operation should combine the interests of the concessionnaires with those of the public. As a general rule it is necessary that the conceding powers should afford the maximum of facility and simplification so that the construction can be effected economically and that it may be possible to perform the service in a simple, economical, commercial and rational manner.

« In relation to this, the Congress draws attention to the findings adopted by the Rome Congress in 1922 which showed clearly the great differences that existed between the working conditions of the employees on main and light railways, differences that must be given the greatest consideration if the working of light or secondary railways is not to be imperilled. »

In the discussion of paragraph 3 of the summary, Mr. V. De Benedetti did not think it necessary to go into these details, which he suggested should be omitted. This suggestion was opposed by many speakers : Messrs. Van Leeuw (*Belgian Government*), de Souza (*Portuguese Government*), Avril (*North Western Railway of India*), General Mance (*Permanent Commission*), Thonet, Launay, F. Level and Jacobs (*Belgian National Light Railways*), all of whom drew attention to the heavy load placed on the concessionnaires in the form of transport being provided free or at reduced rates both for passengers and goods. Some members even wished that the text of the paragraph should be amplified to take account of the competition which the motor-bus services and suburban train services organized by

the main lines opposed to the light railways.

Actually the authorities are showing increased favour to the competitive services to the detriment of the existing services.

The text proposed by Mr. F. Level was then put to the meeting and adopted :

« 3. — Except in cases where adequate compensation is made, the new lines must not be burdened with a load of services, free or at reduced tariffs, the cost of which should fall upon the conceding powers, who would have to bear them if the light railways were not constructed.

« Attention should be drawn to the matter of the development of motor-bus services and also to the disastrous effects upon the interests of the light railways brought about by the very considerable reductions in rates in suburban areas which the main railways are able to make owing to subsidies received directly or indirectly from the public authorities. »

Point 4 immediately called forth a protest from Mr. F. Level who, apparently had lost sight of the fact that the proposal to suppress the participation of the State related to the gross receipts of the lines. The meeting, on the attention drawn to the paragraph by Mr. Level thought that the text should be made more explicit and the object of the proposal should be stated more clearly.

After an interesting exchange of views between Messrs. Bouteau, G. Ottone (*Federation of Transport, Italy*), de Souza, V. De Benedetti, Giovanola (*Tessin Railway, Italy*), F. Level, Launay and Vallecchi (*Federation of Transport, Italy*) two texts were proposed, the one by Mr. De Benedetti and the other by Mr. F. Level. On the matter being put to the vote the former was rejected and the latter was accepted as follows :

« 4. — The principle of the participation of the conceding powers in the gross receipts of light railways being irrational from the point of view of operation, and opposed to the public interest, should no longer form a clause in legal agreements and deeds of concession and should be replaced by participation limited exclusively to net profits. »

The President. — The following is the text that will be submitted to the general meeting :

Final summary.

« 1. — For the construction and operation of light railways, financial aid on the part of the conceding powers is generally indispensable.

« 2. — The conditions of construction and operation should combine the interests of the concessionnaires with those of the public. As a general rule it is necessary that the conceding powers should afford the maximum of facility and simplification so that the construction can be effected economically and that it may be possible to perform the service in a simple, economical, commercial and rational manner.

« In addition to this, the Congress draws attention to the findings adopted by the Rome Congress in 1922 which showed clearly the great differences that existed between the working conditions of the employees on main and light railways, differences that must be given the greatest consideration if the working of light or secondary railways is not to be imperilled. »

« 3. — Except in cases where adequate compensation is made, the new lines must not be burdened with a load of

« services, free or at reduced tariffs, the « cost of which should fall upon the conceding powers who would have to bear « them if the light railways were not constructed.

« Attention should be drawn to the « matter of the development of motor-bus « services and also to the disastrous « effects upon the interests of the light « railways brought about by the very considerable reductions in rates in suburban areas which the main railways are « able to make owing to subsidies received directly or indirectly from the « public authorities. »

« 4. — The principle of the participation of the conceding powers in the « gross receipts of light railways being « irrational from the point of view of « operation, and opposed to the public « interest, should no longer form a clause « in legal agreements and deeds of concession and should be replaced by participation limited exclusively to net « profits. »

— This final summary was adopted by the General Meeting on the 27 June 1925.

QUESTION XV.

Traction for light railways.

a) Special systems of traction for light railways;

b) Rail motor traction.

Preliminary documents.

1st report (America and British Empire), by Brigadier-General H. O. Mance. (See English edition of the *Bulletin*, November 1924, p. 1007, or separate issue [with red cover] No. 7.)

2nd report (other countries), by Mr. De Croës. (See English edition of the *Bulletin*, April 1925, p. 993, or separate issue [with red cover] No. 32.)

Special reporter : Mr. De Croës. (See English edition of the *Bulletin*, June 1925, p. 2157.)

Report of the 5th section.

(See *Daily Journal of the session*, No. 7, p. 4.)

The President called upon Mr. De Croës (*special reporter*), to read a summary of the reports submitted by himself and General Mance.

After this had been read, the President threw open the discussion of the final summary. This discussion commenced on the first clause :

« Steam traction is still the system of most general utility. It is desirable, however, to pursue studies with a view to reducing the costs of this system of traction. »

Mr de Souza (*Portuguese Government*) gave some additional information on the light railways of Portugal. There are in that country about 700 km. (430 miles) of metre gauge line, steam traction being solely used. Recently a Mallet type locomotive has been introduced which is capable of hauling heavy trains on severe gradients. The use of electricity was not contemplated at the present because of the high cost of installation and because the passenger traffic was not sufficient to justify this expenditure. The Portuguese rivers were apt to become dry during the summer, and it would therefore be necessary to have, in addition to hydro-electric power stations, thermo-electric stations to provide for this period of the year. For lines carrying light passenger traffic, attempts were being

made to replace steam trains by motor-rail cars. There was in existence an Italian type of car which appeared very satisfactory, in which the motor can be easily separated from the coach, which avoided holding this out of traffic while repairs were being carried out to the motor.

Mr. Sapin (*Tarn Departmental Railways, France*), in referring to a portion of the report of Mr. De Croës, stated that the Restucci valve had enabled an economy of from 17 to 25 % to be made, and in cases where inexperienced drivers were employed it has even been possible to effect economies of 22 %.

Mr. Watson (*London & North Eastern Railway*) gave details of experiments of the « Sentinel-Cammell » steam locomotive, which had given very good results. There was reason to believe that much could be expected from the tractive force which it was possible for this engine to develop. Within the last month or two a locomotive of this type of 112-115 H.P. had hauled, on the level, a train of 500 tons. He thought he was safe in saying that hitherto this feat had not been equalled by a locomotive of such a small type. Practical demonstrations had been given at the Crewe workshops of the London Midland & Scottish Railway.

In view of these developments, he could not agree with the latter part of point 1 of the Special Reporter's summary. He held optimistic views on the subject, and felt quite certain that further economies could be effected in steam traction on light railways. He was of opinion that an endeavour should be made to reduce costs on lines having a light traffic, and this observation applied equally to normal gauge as well as light railways.

Mr. F. Level (*Local Railways, France*) agreed that steam traction is as a rule the most convenient method of working light railways, but he wished to make certain modifications in the second part of the clause in view of certain improvements made in the use of steam locomotives on light railways. The Congress should not discourage these efforts by a pessimistic opinion, and he therefore proposed the following wording :

« It appears desirable, however, to carry out investigations with a view to reducing the costs of this system of traction. »

Mr. De Croës (*special reporter*) said he had no objection to this amendment. In his opinion the wording which he had proposed went merely to establish a comparison between steam and other methods of traction from which he anticipated better results from the point of view of reducing working expenses.

Mr. Forbes (*County Donegal Railways, Ireland*) said that the County Donegal Railway had been the first light railway in the United Kingdom to adopt the system of superheating. This had enabled them to make a 25 to 40 % reduction in their coal consumption and, as a result, they were gradually converting all engines into superheaters. This applied to what they called their main lines. On less remunerative lines, however, and on lines where frequent stops were necessary, steam traction was too expensive as it incurred the employment of a driver, a fireman and a cleaner for each engine. What was required was something in the nature of a petrol engine capable of hauling a light mixed train conveying passengers and three or four wagons for goods. It was not possible to employ 40-ton locomotives on the light and less remunerative lines in question, and he

considered that the « Sentinel-Cammell » type required too large a staff.

Mr. Mellini (*Sardinian Secondary Railways*) gave some information on the *Bagruilo* locomotive burning heavy oil. The first tests were carried out 15 years ago, and while the fuel consumption of an ordinary locomotive is 9 kgr. of coal per kilometre (31.7 lb. per mile) costing about 2.4 lires, this was reduced on the *Bagruilo* to 45 centimes worth of heavy oil. Moreover, this engine only required a driver in place of a driver and fireman employed on the ordinary locomotive.

The President stated that the question of suitable types of traction would be discussed later in the proceedings, and put to the vote the amendment suggested by Mr. Level.

Mr. Thonet (*Tramways of Lombardy & Emilia [Romagna], Italy*) proposed that the words « It appears desirable » be replaced by « It is desirable ».

The resolution was adopted with this modification, the final wording being as follows :

« 1. That steam traction is still the system of most general utility. It is desirable, however, to carry out investigations with a view to reducing the costs of this system of traction. »

First motion.

At this stage Mr. Giovanola (*Tessin Railway, Italy*) asked that the discussion might be suspended in order that he might propose a motion. A number of members of section V were considerably alarmed by the modifications which the Permanent Commission proposed to apply to the statutes controlling the conditions of membership of the Association. This question was of special interest to section V, and he considered that it should be discussed by the section before it was dealt with at the General Meeting.

The President stated that as this was a matter which did not appear on the agenda, it was possible that there might be various delegates absent who would be desirous of taking part in a discussion on the point. He was, however, willing to follow out the wishes of the section. The motion for the suspension of the question of traction in favour of a discussion on the rules of admittance was then put. The motion was carried.

Mr. F. Level was elected to deal with this question. He stated, that already at Rome it had been proposed to render the conditions which railway companies had to fulfil to become members of the Association more stringent. Strong opposition was raised at the General Meeting by those concerned, and it was subsequently decided that no modification should be made. The question had now again come up under another form. The rules it may be remembered were as follows : The only railway administrations who may be admitted to the Association are those whose principal business is the running of railways worked by mechanical traction whether owned or leased by a public authority open for public traffic and having as a minimum : 1° if only passenger traffic is carried with or without parcels traffic, 100 km. (62 miles) of length open for traffic with average receipts of 2 million gold francs for the last three years; 2° if freight traffic is carried with or without passenger traffic, 200 km. (124 miles) of line open for traffic with average receipts of 500 000 gold francs.

The proposals put forward at Rome would have resulted in a certain number of small companies belonging to the

Association being excluded; the proposals now put forward did not affect those already belonging to the Association but would prevent small companies who wish to become members being allowed to.

The arguments put forward at Rome in 1922 should again be raised. One cannot determine the importance of the company by the length of its system nor evaluate the contribution which it may make to progress on a basis of its mileage. In fact, it is often the small companies, on which questions of economy are of the greatest importance, who are the first to discover or experiment with new methods of operation.

Mr. Level cited the case of the Northern Railway of Belgium, which, although its length was 71 km. (44 miles) had receipts of 41 000 000 gold francs. In accordance with the proposed rules this important company could not be admitted if it were not already included in the Association. This example showed clearly that one could not determine the importance of a railway by the extent of its system. Mr. Level, speaking on behalf of a number of members, asked the President to make representations to the Permanent Commission in the name of the section to induce them to abandon the proposed modifications or to substitute less rigid rules.

Mr. Vallecchi (*Federation of Transport, Italy*) considered that the proposal of the Permanent Commission was illogical. All forms of enterprise developed gradually. If the small companies are excluded they are isolated in the first years of their existence when they are most in need of the assistance of a powerful association which includes the most important and long established companies.

Mr. Giovanola cited the case of the Interprovincial Tramway Company of Milan-Cremone, whose system was of 145 km. (90 miles) in extent and which would have to cease to belong to the Association because it was admitted after 1922.

Mr. Thonet quoted the case of the local lines which the Belgian Government are encouraging in the Belgian Congo. These lines are of considerable importance from the point of view of the economic development of the colony. These railways deserve to be assisted by all the means at the disposal of the Association, whereas the new rules would result in their being excluded.

Mr. Gevaert (*Belgian National Light Railways*) put forward the following argument : it was equivalent to saying to some of the small companies « You do not fulfil the new rules which we are drawing up as regards admission to our Association, however, we will tolerate your presence because you were admitted before 1922 ». What authority and what prestige would these poor relations have in the future in their dealings with the more important companies. It is tantamount to creating two grades of members in the Association which would have the most undesirable effects on the work of the Association.

The President stated that no one had opposed the views put forward by Mr. Level and his colleagues, and he supposed that they were unanimous to opposing the proposal of the Permanent Commission. He thanked Mr. Level for his statement, and proposed to nominate a committee of three or four members to lay the views of the section before the Permanent Commission.

After a discussion, the following were elected members of the Committee : Messrs. Thonet, F. Level, Forbes and

Vallecchi. Accompanied by Mr. Semenza, they asked for an interview with Mr. Foulon, President of the Permanent Commission.

— THE PRESIDENT communicated the request made by the section to Mr. Foulon. The latter had promised to review the question of the modification of the Statutes sympathically (1).

Second motion.

This question was raised by Mr. G. OTTONE (*Federation of Transport, Italy*) who drew the attention of the section on the views put forward in the 1st section on the subject of level crossings. This matter was not included on the agenda of the 5th section, but as it was a matter of the very greatest importance for light railways, the section could not but be interested. It should be in order for them to discuss the final summary of the 1st section, and if necessary, propose such amendments or additions as they might consider necessary.

With the unanimous approval of the section, the PRESIDENT proposed that Mr. Ottone and another member should put forward a clear and simple resolution which the section might discuss and vote upon.

Mr. F. LEVEL supported Mr. Ottone's motion. Three points in the final summary put forward by the 1st section appeared to him particularly undesirable for light railways. It is generally admitted that these need not be guarded and that there was no necessity to take special precautions at their level crossings. However, clause 2 proposes that unguarded level crossings should be notified to road users by visible signals by day and night, and that these signals should be preceded by other advance signals placed at a suitable distance. Up to the present warning signals were erected by the road users. Light railway companies could not erect and maintain posts placed off the line. They could not especially accept responsibility for accidents which might occur as the result of the removal or bad condition of these warning posts.

For the same reason, there were grounds for opposing clauses 10 and 11, the first of which asked the various countries to impose rules which up to the present had never existed for light railways, and the second placed at the charge of the companies part of the expense of erecting and maintaining the warning apparatus.

Mr. DE SOUZA stated that in Portugal, the decisions of the Congress are often quoted by authorities in their dealings with the companies. The final summary of the 1st section is dangerous because it gave ground in the contest which railway companies had to put up against the requirements of the authorities. It is, therefore, very necessary to propose an amendment to this final summary.

Mr. RAVENEK (*Dutch Government*) stated that he had been present at the discussions of the 1st section and that the summary in question referred exclusively to normal gauge railways. This observation was not, however, accepted by the section, which was of opinion that there was nothing in the conclusions of the 1st section to justify the assumption that light railways were not included.

Mr. OTTONE then read the draft resolution to be submitted on the summary of the 1st section relative to the question of level crossings :

(1) See the account of the General Meeting.

« In the working of light railways, the suppression of level crossing keepers should not be accompanied by rules which, in the majority of cases, would involve onerous complications which would fail to meet necessities relative to the operation of lines where the frequency of trains and speed are generally limited. It is also necessary to note that the rules in question would not be in conformity with the acts of concession relative to the majority of light railways.

« The 5th section request, therefore, that the following text be added to the summary of the 1st section :

« Addition : The preceding recommendations refer exclusively to normal gauge railways and do not apply to light railways and feeder lines. » (1).

The resolution was adopted, but Mr. Launay (*French West African Railways*), not being in accord, requested that observations which he intended to prepare should figure in the minutes of the Conference.

Resumption of the discussion.

In the temporary absence of Mr. Semenza, Mr. Bals, vice-president, took the chair. He put to the vote the first paragraph :

« 1. — Steam traction is still the system of most general utility. It is, however, desirable to carry out investigations with a view to reducing the costs of this system of traction. »

— This was carried unanimously.

The second paragraph :

« 2. — The adoption of electric traction depends essentially on financial considerations. The latter differ according to the conditions prevailing on the different lines. In proportion as initial expenditure and working expenses diminish, it will be possible to develop the use of this system of traction. »

As this called for no remarks, it was adopted unanimously.

The President then threw open for discussion the third paragraph.

Mr. G. Level (*Light Railways, France*) said that a long experience with internal petrol rail cars led him to differ with the view put forward by Mr. De Croës. They had used on rails, that is to say, with a metal to metal contact between wheel and rail, vehicles which were designed for pneumatic tyres, the result being that the motors soon get out of order on account of vibration. He therefore proposed the following amendment :

« That traction by combustion engine motors presents, at present, some interesting features which will, perhaps, become advantageous in the future. It is desirable that at the next Congress precise data should be submitted relative to working, maintenance costs and depreciation. »

Mr. Verhoop (*Dutch Government*) said that the problem of the petrol car was receiving much attention in Holland. The question was not only being studied by the principal railways, but also by the Steam-Tram Companies. All the present petrol cars are fitted with mechanical transmission, and their weights vary according to type and are anything from 9 to 34 tons. The variable speed gear used on the heavy cars are actuated by compressed air. The gears of other cars (up to 22 tons) are operated by hand.

Although definite results have not yet

(1) See the discussion in the General Meeting published at the end of the report of the section dealing with question I-B.

been published, the mechanical drive is the weak spot in the construction of these cars, not only as regards maintenance, but also with regard to fuel consumption and noise when running other than in top gear. Generally speaking, these cars did not permit an appreciable saving in working costs. Inspection, repairs and higher fuel costs counteracted any economies made in wages. For these reasons, therefore, he proposed that the summary should include an observation to the effect that improvements in the drive of internal-combustion engines, and attempts to find a cheaper fuel, are very desirable.

Mr. Mellini stated that the Ministry of Public Works in Italy had been engaged in fostering investigations in this direction, and, in fact, granted subsidies for the purpose. This method of traction was first used on the large lines. The Fiat Company in Turin had constructed a 400 H. P. Diesel electric vehicle for use on light railways which was capable of taking gradients of 1 in 16. The chief difficulty at first was found to be vibration in the driver's cabin. This was, however, eventually overcome. He observed that the question of vibration was giving much trouble to the railways in Russia. Another locomotive built by Rossi of Milan of 360 H. P. was capable of attaining speeds of 60 km. (37 miles) per hour, but the trials had only just commenced and one could not give any definite information within about six months.

Mr. Mellini then gave details of the other types of rail cars under trial on branch lines. He considered that with heavy oil one might effect a considerable economy in fuel, as this only costs one-fifth the price of petrol, which in Italy costs 3 1/2 lires per kilogram.

One could, he considered, replace 30 to 40 % of the present steam traction by motor rail cars.

In conclusion, he considered that the problem of the use of rail cars was presented under favourable circumstances. One must not hope for too much, but it was certain from the trials already carried out that something could be achieved. He was quite willing to accept Mr. De Croës wording, but he thought that greater attention was beginning to be given to steam locomotives for light railways as the result of competition with the rail cars.

Mr. Watson gave interesting results in connection with experiments made on the London & North Eastern Railway. Two years ago an ordinary road bus had been converted for use on rails and had been running about 150 miles per day. It had been transformed in such a way as to render possible control from both ends. The cost worked out at 4 d. per mile, and its weight was 6 tons, with a seating capacity of 28. Another rail car had been built with a seating capacity of 36, which could attain a speed of 35 miles per hour; the maximum speed could be reached as rapidly as with an ordinary train.

Another experiment had been made on a light railway near York. Two Ford chassis had been placed back to back in such a manner that control could be exercised from either end. Consequently, when running, one served as a trailer vehicle and the other provided power. The cost did not exceed 5 d. per mile, and there was accommodation for 36 passengers.

This mode of traction had given such satisfaction that the construction of still larger motor rail vehicles was contemplated. To sum up, he considered that

for seating accommodation up to 60, rail cars were very suitable, but beyond that it was better to retain steam traction.

He was of opinion, therefore, that in view of the satisfactory results of experiments made, the wording of the clause under discussion should not be so constructed as to give the impression that the internal-combustion engine was in its infancy as it has passed beyond this stage. With regard to the employment of this mode of traction in the hauling of merchandise, experiments had shown that a 56 H. P. motor would take a load of anything up to 50 tons.

At this stage, Mr. Semenza resumed as President.

General Mance (*reporter*) asked Mr. Watson what was the object of constructing the heavier vehicle of 17 tons with 100 H. P. to carry only eight passengers more.

Mr. Watson gave the following reasons:

1) The construction of the larger vehicle made it possible to provide more comfortable accommodation for the passengers and thus popularise this mode of travel;

2) It was possible to seat an additional eight passengers, which was important;

3) The larger vehicle made it possible to reduce vibration.

Mr. Lo Balbo (*Piemont Steam Tramways, Italy*) gave a brief description of two types of the Romeo motor rail cars, *viz :* one of 100 H. P. and one of 160 H. P. These engines were fed with petroleum and petrol, burning two-thirds of the former and one-third of the latter. These types of engines enabled 50 % economies to be made both in fuel and personnel. Gradients of 1 in 25 could be negociated and a speed of 60 km. (37 miles) per hour could be attained. The Government of his country had granted subsidies with a view to further trials being made with this particular type of engine. He agreed that the question be further dealt with at the next Congress.

Mr. Vallecchi gave some information on the light motor rail car constructed by the Italian « Ferrautovie » Company. There were two types in existence : one of 30 H. P. weighing 5 tons and accommodating 36 passengers had been on trial during the last four months on the Massa-Fallonica line in Tuscany. The cost of fuel, lubrication and ordinary maintenance amounted to 39 centimes per kilometre. The other of 80 to 100 H. P. weighing 8 to 9 tons and accommodating 80 passengers was under construction, and better results are anticipated.

Mr. F. Level expressed himself in agreement with previous speakers and gave particulars of experiments which had been made on his railway in converting motor lorries into rail motor vehicles. One difficulty which presented itself, however, was turning the vehicle round, but this had been overcome by means of each car carrying a portable turn-table. He gave details of 8-ton and 11-ton vehicles which were under construction and were being equipped with reversible gear which would dispose of the difficulty of turning.

In his opinion the problem of rail cars was not so much concerned with traction in view of the perfection attained by internal combustion engines. It was rather a problem of operation. If one wished to crush a fly one did not employ a steam hammer. Even rail cars may be of too high a capacity in many cases where the passenger traffic was insufficient to jus-

tify steam traction, whereas, in accordance with the requirements of the authorities, and to meet public needs, we have often to resort to the use of rail cars.

One could not give definite figures of the working by this method, because nothing is known of the renewal charges and heavy repairs, as the period during which they have been under test has been insufficient. All we know is that all the costs entailed up to the present have been less than those of steam traction.

He considered that the wording of the first clause of the final summary should be more definite, and he proposed the following : « that traction by means of the internal-combustion engine, at present, furnishes advantageous solutions with regard to certain working problems, that it is full of promise for light railways and should be financially encouraged by the conceding powers ».

— After a discussion, the following final text was adopted :

« 3. — Traction by means of the internal-combustion engine, at present, furnishes advantageous solutions with regard to certain working problems, that it is full of promise for light railways and should be encouraged.

« It is desirable that some definite data on the cost of maintenance and depreciation in connection with rail motor coaches be submitted at the next Congres. »

The President. — The following is the text which is to be submitted to the General Meeting :

Final summary.

« 1. — Steam traction is still the system of most general utility. It is, however, desirable to carry out investigations with a view to reducing the costs of this system of traction.

« 2. — The adoption of electric traction depends essentially on financial considerations. The latter differ according to the conditions prevailing on the different lines. In proportion as initial expenditure and working expenses diminish, it will be possible to develop the use of this system of traction.

« 3. — Traction by means of the internal-combustion engine, at present, furnishes advantageous solutions with regard to certain working problems, that it is full of promise for light railways and should be encouraged.

« It is desirable that some definite data on the cost of maintenance and depreciation in connection with rail motor coaches be submitted at the next Congress. »

— The General Meeting ratified this final summary at its meeting on the 1 July.

VARIOUS MOTIONS

Motion relating to the drafting of the programme of the eleventh session.

Suggestion put forward by the 5th section at its meeting on the 26 June 1925 :

General MANCE (*reporter on question XV*) suggested that it be recorded that the section desire to suggest that, at the next Congress, the subjects in section V might with advantage be divided into the following questions, which are of particular importance in the present state of railway development :

« *General heading.*

« Pioneer railways of penetration;

« Feeder railways;

« Rail motor cars (all railways).

« Question A :

« The establishment of :

« *a*) Pioneer railways of penetration in new countries;

« *b*) Feeder lines in all countries.

« Question B :

« *a*) Special systems of traction for feeder lines;

« *b*) Rail motor traction.

« Question C :

« The economic handling of small quantities of passenger and freight traffic on existing railways. »

Mr. M. SEMENZA (*Federation of Transport, Italy*) wished to include the question of the electrification of light railways.

General MANCE pointed out that this was included under question B, but Mr. Semenza urged that his view should be mentioned in the minutes.

— General Mance's motion was carried.

SUMMARY REPORT OF THE DISCUSSIONS

AT THE GENERAL MEETINGS

(27 June and 1 July 1925).

General secretaries : Sir Henry Fowler and Mr. P. Ghilain.

Meeting on 27 June 1925.

The meeting opened at 9.30 a. m. The Right Hon. Viscount Churchill, president of the tenth session, taking the chair.

He was supported by Mr. Foulon, president of the Permanent Commission, Mr. Ghilain and Sir Henry Fowler, general secretaries, Messrs. Colson and Marchal, vice-presidents of the Permanent Commission, and Messrs. Behrens and Braem, members of this Commission.

Mr. Ghilain, *general secretary,* read the various reports of the sections.

— The final summaries proposed concerning questions I-A, IV-A, IV-B, IX, X, XI, XIII and XIV did not give rise to any discussion, and were ratified by the meeting.

Question I-B. — The summaries were approved without discussion. Nevertheless, at the request Mr. F. Level (*Local Railways, France*), a thirteenth article was added to those put forward by the Section. This article reads as follows :

« The foregoing recommendations only apply to main lines and do not apply to light railways. »

Question III. — The President then puts to the meeting the statements proposed jointly by the first and third sections.

Mr. Simon-Thomas, *special reporter,* was not satisfied with the wording of article 12. There exists a marked difference between the various methods of braking, to which he has called attention specially in his reports.

On the Continent, up to the present, a shoe-brake alone had been considered satisfactory, especially the brake made by the Bussing Company, which was largely employed in Denmark, Sweden, Switzerland, Tchecoslovakia and Germany, and which had been applied mechanically in France since 1924.

At the present time there was also another and quite different method, which consisted of obtaining retardation by means of braking rails placed inside and outside the track. One brake of this kind, the invention of Mr. Hannauer, was installed in the Gibson Station of the Indiana Railroad. Other systems again had been described in Mr. Simon-Thomas' report.

He proposed the following wording, which was adopted by the meeting :

« Article 12. — The speed of wagons « should be capable of being reduced

« when required. In order to carry this « out there are various methods in use, « amongst which may be noted shoe « brakes, either mechanical or otherwise, « or braking rails, automatic or non- « automatic, which are dependent upon « the weight of the wagon, etc. »

Mr. PRETORIAN observed that the wording of article 15 did not agree exactly with the wording adopted; he proposed to replace the words « the bottom of the slope of the gradient » by « the set of points at the head of the sidings ».

— This modification was accepted by the meeting.

« ARTICLE 15 therefore becomes « the « distance between the top of the hump « and the set of points nearest to the head « of the sidings should be as short as « possible. The lay-out of the head of the « siding should be such that there is no « great difference between the resistances « offered by the different roads; that the « distance between the set of points at « the head of the siding and the fouling « point should be reduced to a minimum « and be so far as possible the same for « all the roads. If necessary, the head of « the siding can be given a sufficient in- « cline to overcome resistances due to « curves and reverse curves. »

— The other articles were adopted without remark.

Question XII. — A discussion took place on the wording of the final summary. On the proposal of the chairman, this question was adjourned to the general meeting on Wednesday, 1 July.

Meeting on 1 July 1925.

The meeting commenced at 3 p. m. Sir Evelyn CECIL, vice-president, in the chair, supported by Mr. FOULON (president of the Permanent Commission), Mr. GHILAIN and Sir Henry FOWLER, general secretaries, Messrs. COLSON and MARCHAL, vice-presidents of the Permanent Commission, and Messrs. BEHRENS and BRAEM, members of this Commission.

1) Admission of Russians.

Mr. GHILAIN, *general secretary*, explained the circumstances under which the Russian Railways have asked for admission to the Congress, and he read a resolution passed unanimously by the Permanent Commission.

— The Meeting ratified this resolution, which is worded as follows :

« The Permanent Commission considers that the situation in Russia, especially from the point of view of railways, does not appear sufficiently stabilised to enable this country at the present time to be included in the number of those to which the Association of Railway Congress extends. »

2) Conversations on the question of the admission of Germans. — Solution proposed by the Permanent Commission.

Mr. GHILAIN, *general secretary*, after giving certain explanations with regard to the conversations in which Mr. Margot, director general of the *Paris-Lyons-Mediterranean Railway Company*, Railway Delegate of the Dawes Commission, Berlin, had taken part, read the proposal submitted to the Congress by the Permanent

Commission. This proposal is worded as follows :

« The Congress gives authority to the Permanent Commission to decide in the ordinary course of its deliberations the question of the inclusion of Germany among the countries to which the Association extends, and empowers it to increase the number of members of the Permanent Commission from six to the maximum on this occasion. »

This resolution was carried with only four voting against it. In agreement with the proposals of the Permanent Commission it was unanimously decided that no preference should be granted to any adherent in this connection.

Mr. Willem (*Belgian State Railways*) asked whether this decision did not equally apply to other countries, such as Austria, Hungary, Bulgaria and Turkey.

After a discussion, in which Messrs. Colson, Debarsy (*Belgian National Light Railways*), Tcheou Weï (*Chinese Government*), and G. Level (*Light Railways, France*), took part, the Meeting decided that in the case of no demand for admission being made, either officially or semi-officially, by these countries there could be no question of extending to them the benefit of the decision applying to Germany. It is, however, to be understood that any request put forward by these countries would be sympathetically considered.

3) Confirmation of appointments of members of the Permanent Commission made during the period 1922-1925.

The appointments made by the Permanent Commission during the period in question were in respect of the following gentlemen : Messrs. Marchal, Lamalle, Ghilain, Abdul Hamid Pacha Soliman, Burgess, Gioppo, Ikeda, Sir Henry Fowler, Sir Ernest Albert S. Bell, Sir Henry W. Thornton.

— The General Meeting confirmed these appointments unanimously.

4) Election of members of the Permanent Commission for the appointments expiring this session.

The appointment of the following members of the Permanent Commission, whose period had expired :

1. Sir Evelyn Cecil;
2. Jacques;
3. Molle;
4. Caufriez;
5. Willard;
6. Atterbury;
7. Javary;
8. Mange;
9. Brooke;
10. Viscount Churchill;
11. Fabris;
12. Fiori;
13. Tajani;
14. Frank;
15. Herold;
16. Kunz.

— These appointments were unanimously confirmed.

The Meeting, on the proposal of the President of the Permanent Commission, elected the Right Hon. Viscount Churchill, President of the tenth Session, as life member of the Permanent Commission.

The Meeting, on the proposal of the Permanent Commission, decided that the place rendered vacant by this appointment should be occupied by Sir Ralph Lewis, Wedgwood, C. B., C. M. G., Chief General Manager, London & North Eastern Railway.

5) Discussion on the revision of the statutes.

THE PRESIDENT submitted to the meeting the proposed modifications to the statutes as put forward by the Permanent Commission and which had been circulated to the adherent Governments and participating Administrations. These proposals, together with a statement showing the reasons, which are reproduced below, have, moreover, been distributed to all the delegates attending the session.

REASONS FOR MODIFICATIONS.

The modifications proposed concern articles 2, 4, 6, 7, 11, 12, 13, 14, 15, 17, 18, 19 and 20, and entail an addition of articles 20*bis* and 20*ter*.

M. COLSON set forth the reasons which have led the Permanent Commission to take these steps so far as concerns essential changes :

ARTICLE 2. — It is necessary to define exactly the conditions which must be fulfilled by Administrations in order to qualify them for admission to the Association, and it appears advisable to specify that only Administrations who directly *operate* railways may become members of the Association.

On the other hand, it appears absolutely necessary that our statutes should provide for the admission of international organisations who deal essentially with questions of railway working.

ARTICLE 4. — Independent of a few formal alterations arising from the amendments referred to in article 2, this article lays down the new conditions, notably those concerned with the minimum amount of receipts which must be earned by future adherents of the Association.

Railway Administrations admitted after the formation of the Association which do not fulfil the new conditions will no longer be able to belong to the Association.

The Permanent Commission has considered it necessary to specify a gold standard in determining the receipts, in order to be independent of the influence of variations in the rate of exchange.

ARTICLE 6. — This lays down in a more precise manner the qualification which must be possessed by members of the Permanent Commission to retain office.

ARTICLE 7. — The existing rule is based on the principle that it is advisable that the first Vice-President should have his residence in Belgium (Headquarters of the Association) so that he may be at once available in case of absence of the President.

Experience has shown that this is not necessary. It is sufficient that one of the Vice-Presidents should be at the Headquarters of the Association.

ARTICLE 11. — This is a purely formal modification. (See art. 2.)

ARTICLE 12. — The number of delegates which may be nominated by the participating administrations is no longer limited. The number will be proportional to the extent of the system. This provision is made so as to allow the large companies which are formed by the fusion of a number of companies to be represented at the Congress by a number of delegates in keeping with their importance and with the amount of their subscription.

For reasons given above, the Permanent Commission thinks it advisable to adopt the gold franc as a monetary unit.

ARTICLE 13. — The modifications proposed deal with the composition of the official staff of the sessions, and are the result of practical experience.

ARTICLE 14. — As regards the composition of the official staff of the sections, the proposal to nominate several principal secretaries is with the object of providing, for editing the minutes of the

discussions in the sections, specialists acquainted with the two languages used, French and English, or the language of the country in which the session is held, who should be chosen in such a way that the report of the proceedings in French and in English (or in the language of the country in which the session is held) shall be prepared by the principal secretaries in their own language.

ARTICLE 15. — This article deals with the selection of questions which are to be discussed.

ARTICLE 17. — This article determines the subscription to be paid by the adherents, assuming that the gold franc is adopted as a monetary unit.

ARTICLES 18 and 19. — These are purely formal modifications.

ARTICLES 20, 20*bis*, 20*ter*. — The Permanent Commission being of the opinion that the question of the revision of the statutes should be looked into, has considered it advisable to draft two new articles and to modify the existing article 20.

The proposed modifications deal with the composition of the special committee entrusted with drawing up a report on the whole question of the revision of the statutes, on the method of receiving proposals on this matter, and for fixing the method of voting on a question of a modification of the statutes. The proposed text stipulates that before a resolution is definitely adopted, a written ballot is to be taken of *all the adherents* of the Association.

The PRESIDENT called on Mr. COLSON, first vice-president of the Permanent Commission, the reporter on this question, and the proposed modifications were examined article by article.

PRESENT TEXT.	PROPOSED MODIFICATIONS.
ARTICLE 2. — The Association is composed of State Railway Administrations, or of Administrations of a railway conceded to, or worked by public initiative in countries which have joined the Association. It is composed of the Railway Administrations appearing in the list published in the September 1922 number, page 1274, of the *Bulletin of the International Railway Congress Association.* The Governments of the countries to which the Association extends may also join the Association. The list of these countries may be altered by a decision of the Congress as laid down in the revised rules by article 20 which follows.	ARTICLE 2. — The Association is composed of State Railway Administrations, and of Administrations *directly concerned with the working of* railways of public utility in countries which have joined the Association. Add : *International organisations who deal essentially with railway operation may be admitted as adherents of the Association.*

Mr. VALLECCHI (*Federation of Transport, Italy*), proposed the adoption of the new wording of the first paragraph.

— Carried.

ARTICLE 2, NEW PARAGRAPH. — After a long discussion, in which Messrs. COLSON, VALLECCHI, Pierre JOURDAIN (*North Eastern Light Railways, France*), F. LEVEL (*Local Railways, France*), Sir Henry FOWLER and TAJANI (*Federation of Transport, Italy*), took part, the PRESIDENT put to the Meeting the following amendment, proposed by Mr. P. Jourdain :

To complete as below the text of the new paragraph :

« ... as well as National Unions comprising administrations operating at least 5 000 kilometres of railway not forming part of the Association. »

— This wording was adopted by 85 votes against 22.

ARTICLE 4. — The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association subject to ratification by the next Congress.

It has power to arrange for the admission of Railway Administrations who apply, subject to a report prepared by a member nominated by the President.

Only those Administrations may be admitted whose principal business is the running of railways worked by mechanical traction of a length of at least 100 km. (62 miles) in active service, or conceded to a public company and worked in the public interest.

In fixing the minimum of 100 km. (62 miles) mountain sections, where special means of haulage are employed, may be calculated at double their actual length.

ARTICLE 4. — The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association *and of the participating organisations* subject to ratification by the next Congress.

It has power to arrange for the admission *of these organisations* and of Railway Administrations who apply, subject to a written report prepared by a member nominated *in each case* by the President.

The only Railway Administrations who may be admitted to the Association, beyond those who constituted it in 1922, are those whose principal business is the running of railways worked by mechanical traction, whether owned or leased by a public authority, open for public traffic and having as a minimum :

1° *If only passenger traffic is carried, with or without parcels traffic, 100 km. (62 miles) of length open for traffic with*

All railway companies admitted after the final constitution of the Association passed by the Congress held in Rome in 1922, which no longer comply with, and which have ceased to fulfil the above conditions, or go into liquidation or fail, will cease *ipso facto* to form part of the Association. The same shall apply to any railway company which does not pay its subscription for more than two years.

The admission of an Administration in a State which itself is only provisionally included in the Association, under the terms of the first paragraph of this article, remains provisional until the admission of the State itself is confirmed.

average receipts of 2 million gold francs for the last three years (1).

2° *If freight traffic is carried, with or without passenger traffic, 200 km. (124 miles) of line open for traffic with average receipts of 500 000 gold francs* (1).

Administrations cease to belong to the Association if they fall within either of the following categories :

a) *Undertakings which enter into liquidation or default and Railway Administrations which cease to operate their lines directly in the public service;*

b) *Members who have not paid their subscriptions for more than two years and who, having been duly notified, have not paid the arrears;*

c) *Railway Administrations admitted subsequent to the formation of the Association which no longer fulfil the conditions laid down in paragraphs* 1° *and* 2° *given above.*

(1) *The total receipts for each year in gold francs is calculated, where the actual receipts are in paper money having legal currency, by expressing the receipts in pounds sterling in accordance with the rate of exchange in force on the first day of the year in question, and taking the pound sterling as being equal to 25 gold francs.*

In calculating the length of line, sections of mountain railway worked by special methods of haulage are taken as equivalent to twice their length.

Mr. Colson gave an explanation of the reasons justifying the proposed alteration, and announced that the Permanent Commission was of the opinion that no distinction should be made between railways carrying passengers only and those giving a complete service (passengers and freight).

After a discussion in which Messrs. Colson, Pirard (*Catalan Railway, Spain*), Van Leeuw (*Belgian Government*), F. Level and G. Ottone (*Federation of Transport, Italy*), took part, the following text was put to the vote :

« ... having at least a length of 100 kilometres in service and an average receipt of 2 000 000 gold francs for the last three years ».

— This text was adopted by 72 votes against 46.

— The remainder of the text of article 4 was adopted.

It was also agreed, on the proposal of Mr. F. Level, that paragraph *c* should not apply to the receipts if a falling-off occurred due to a cause beyond the control of the administration.

Article 6. — The Permanent Commission shall be composed of ex-presidents of the sessions of the Congress, ex-officio members and elected members, the number of which shall be fixed by each Congress.

The elected members shall be, as far as possible, chosen to represent the different nations. Under no circumstances shall any one nation have more than nine elected members.

One third shall retire at each Congress and shall be eligible for re-election.

Members who have ceased to hold office under an adherent Government, or with a Railway Administration which qualified them at the time of their election, shall cease to be members of the Permanent Commission. It shall be the duty of such a member at once to inform the president when he retired. The Permanent Commission may, upon the application of five members, with the consent of the majority of all its members consulted by letter, ask him to remain until the next Congress.

The Commission shall always have the power to complete its number by co-opting delegates of the participating Administrations and adherent Governments. In this case a final election shall be made at the following Congress.

When the place of meeting of a Congress has been fixed, the Permanent Commission shall have power to co-opt as temporary members representatives of the country in which the Congress is to be held.

Members who have ceased to hold office of any kind, so that they are no longer attached *to the railway service of an adherent Government or* to the Administration which...

— Carried.

Article 7. — The Permanent Commission shall elect from among its members a president and two vice-presidents at

its first meeting after each Congress of the Association.

The president and the chief vice-president shall be chosen from the Belgian members.

The Commission shall appoint a general secretary, a secretary-treasurer and secretaries. As such they shall have the right to attend the meetings in a consultative capacity.

The Commission shall be summoned by the President when the business of the Association requires it, but in any case at least once a year.

A meeting may be held when demanded by any five members.

Questions shall be decided by the votes of the majority of members present. If the votes are equal the Chairman shall have the casting vote.

Minutes shall be kept of the proceedings of the Commission. Nine members shall form a quorum.

If at a first meeting this number is not present the meeting shall be adjourned for not longer than one month, when it shall then be considered valid whatever may be the number of members present.

The president and *one of the vice-presidents* shall be chosen from the Belgian members.

— Carried.

ARTICLE 11. — The following shall have a right to attend the meetings :

1° The members of the Permanent Commission, the secretaries and the secretary-treasurer;

2° Delegates appointed by the Railways and Governments comprised in the Association.

These must belong to the regular and permanent staff of the delegating Administration;

3° The secretaries of sections, and the reporters appointed by the Permanent Commission or by the Executive Committee to report on the items on the agenda.

2° Delegates appointed by the participating Administrations and adherent Governments *and Organisations.*

— Carried.

ARTICLE 12. — The participating Railway Administrations shall be entitled to nominate up to ten delegates according to the mileage of their system in the following ratio :

One delegate for lines of not more than 200 km. (124 miles);

Two delegates for lines of 200 to 500 km. (124 to 311 miles);

One additional delegate for each additional 500 km. (311 miles) or fraction thereof above 500 up to 3 000 km. (1 864 miles);

One additional delegate for each additional 1 000 km. (621 miles) or fraction thereof above 3 000 km. (1 864 miles).

The adherent Governments may also nominate ten delegates as a maximum in the proportion of one delegate for each 200 francs subscription up to 1 000 francs and one additional delegate for each 500 francs over 1 000 fr.

The maximum figures quoted above do not include those members who take part in the Congresses in accordance with the 1st and 3rd paragraphs of article 11, and whom the participating Administrations or adherent Governments include amongst their delegates.

All delegates participate in the Congresses with equal rights.

ARTICLE 12. — The participating Railway Administrations shall be entitled to nominale *a number of delegates in proportion to* the mileage of their system in the following ratio :

Add :

up to 6 000 km. (3 728 miles);

One additional delegate per 2 000 km. (1 242 miles) or fraction thereof above 6 000 km. (3 728 miles) up to 10 000 km. (6 214 miles);

One additional delegate per 4 000 km. (2 485 miles) or fraction thereof above 10 000 km. (6 214 miles).

The adherent Governments *and Organisations* may nominate delegates to a maximum number of 10 in the proportion of one delegate for each *100 gold francs* (1) subscription up to *500 gold francs,* and one additional delegate for each *250 gold francs* over *500 gold francs.*

The maximum figures quoted above do not include those members who take part in the Congresses in accordance with the 1st and 3rd paragraphs of article 11, and whom the participating Administrations, or adherent Governments *and Organisations* include amongst their delegates.

(1) See note (1) to article 4.

— Carried.

ARTICLE 13. — At the opening of each Congress, the officers of the Permanent Commission shall hold office tempora-

ARTICLE 13. — At the opening of each Congress, the officers of the Permanent Commission shall hold office temporari-

rily, until the Congress has elected its own officers as follows :

1° One or more honorary presidents and vice-presidents;

2° One president;

3° Presidents of sections elected as explained in article 14;

4° One or more general secretaries and one or more assistant general secretaries.

The delegate nominated first by each government shall be an ex-officio vice-president.

All officers shall be appointed for the duration of the session.

The election shall take place according to the rules laid down in article 16, paragraph 6. The duties of the officers shall be those laid down by standing orders adopted by deliberative assemblies for the conduct of their proceedings.

After the appointment of the officers, the Congress shall resolve itself into sections, according to the arrangements of items on the agenda submitted by the Permanent Commission.

A member may enter his name for more than one section.

The Congress may also appoint special committees to investigate certain questions.

ly, *and the Congress immediately elect* its own officers as follows :

Paragraph to be deleted.

3° One *general secretary* and one or more assistant general secretaries.

The presidents of sections, elected as explained in article 14 following, shall also be included.

— The third part of the proposal was cancelled, so that there might be one or more General Secretaries. The addition was carried.

ARTICLE 14. — Each section or committee shall appoint its own president, its own chief secretary, and its secretaries. The presidents of sections shall be officers of the Congress in virtue of their position.

The sections and the special committees shall cease with the termination of each session.

ARTICLE 14. — Each section or committee shall appoint its own officers consisting of :

1° a president;

2° one or more vice-presidents;

3° one or more principal secretaries and secretaries.

The principal secretaries of each section or committee, however, shall be nominated by the Permanent Commission.

— Carried.

ARTICLE 15. — The discussions of the Congress shall be confined to the questions which are decided upon by the Permanent Commission, due regard being had to the wishes of the preceding Congress and its sections.

The Commission shall receive suggestions from the participating and constituent bodies. A reporter appointed by the Commission shall prepare a brief outline of each question without expressing conclusions, and also a summary of the contents of the documents which have reached him.

No question shall be discussed at a general meeting without having been first considered by a section or special committee.

ARTICLE 15. — *The discussions of the Congress shall be confined to the questions set down in the agenda for the session by the Permanent Commission. The latter may receive suggestions, either as regards the inclusion of a question or relating to a particular question already raised by participants or adherents.*

A reporter, appointed by the Commission, shall prepare a brief outline of each question placed on the agenda, together with a resume of the documents he has been furnished with; he will not draw up the final summary.

— Carried.

ARTICLE 17. — The expenses of the Congresses, of the Permanent Commission and of the Executive Committee shall be covered by :

1° The annual subscriptions of members;

2° Subsidies and other casual receipts.

The annual subscription shall consist of :

a) In the case of adherent Governments, an amount fixed by themselves;

b) In the case of participating Administrations, a fixed sum of 200 francs Belgian currency, plus a sum proportionate to the mileage of the system. This variable sum shall not exceed 50 centimes Belgian currency per kilometre; the actual rate to be fixed by the Permanent Commission.

The financial year shall begin on the 1 January.

a) *In the case of adherent Governments and Organisations, an amount fixed by themselves, which in the case of adherent Organisations shall not be less than 100 gold francs* (1);

b) *For the participating Administrations, a fixed sum of 100 gold francs* (1), *plus a sum proportionate to the length of the system. This variable sum is fixed by the Permanent Commission, but may not exceed the fifth of a gold franc per kilometre.*

(1) See note (1) to article 4.

— Carried

ARTICLE 18. — Payment of the subscriptions shall entitle the participating Administrations and adherent Governments to receive free, as many reports of the proceedings as the number of their delegates. Other publications of the Association shall be sent to the subscribing administrations in numbers based upon their mileage, in conformity with article 12, augmented by one.	ARTICLE 18. — Payment of the subscriptions entitles participating Administrations, Governments *and adherent Organisations* to receive free as many copies of reports of the proceedings *and other publications* as the number of their delegates.

— Carried.

ARTICLE 20. — Every proposal for a revision of the rules must be submitted to the Permanent Commission, with reasons in support of it, at least three months before the date fixed for the opening of the session, so that the Commission may bring it to the knowledge of the members of the Association at least one month before that date. The proposition cannot be discussed at a full meeting of the Congress unless it has been agreed to either by the Permanent Commission, or if twenty-five participators or adherents desire that the question shall be discussed. In the first case, it shall be discussed on the report of the Permanent Commission, in the second case on the report of a special committee.	ARTICLE 20. — *The rules may be revised by the Congress on the proposal of the Permanent Commission, due notice being given to the participants and adherents one month before the opening of the session.* *Proposals for modifications put forward by participants or adherents must reach the Permanent Commission at least six months before the opening of the session. If they are adopted by the Commission, they are submitted to the Congress by means of a report sent out by the Commission at least one month before the opening of the session.* *If the Permanent Commission does not accept a proposed modification, it shall not be submitted to the Congress, unless it is supported in writing by participating Administrations or adherent Governments or Organisations entitled to be represented by 100 delegates at the Congress. In this case the proposition is submitted to the participants and adherents by the Permanent Commission one month before the opening of the session.*

— As the result of a request by Dr. WANG, *delegate of the Chinese Government*, as regards the time taken for communications to reach the adherents, it was decided that these communications should be sent out two months before the opening of the session. The text of article 20 was therefore modified in consequence.

The remainder of the article was adopted.

Add :

ARTICLE 20*bis*. — *Every proposal for amending the rules shall be discussed by the Congress on a report of a special committee presided over by the President of the Permanent Commission, or by his delegate and composed of 11 members, as follows :*

a) *the President of the Permanent Commission or his delegate;*
b) *four members délegated by the Permanent Commission;*
c) *one delegate from each of the 5 sections which form the Congress, this delegate being chosen after the discussion of the suggestion by the section;*
d) *one delegate representing the authors of the suggestion.*

— Carried.

ARTICLE 20*ter*. — *The proposed modification shall only be considered if it is supported by the clear majority of the delegates present at the General Meeting.*

However, it is not definitely adopted until a written ballot has been taken, each Administration, Government or Organisation belonging to the Association having a number of votes equal to the number of delegates to which it is entitled. A majority of two-thirds of the votes cast is necessary to secure the adoption of the modification.

The results of the ballot will be published in the monthly Bulletin of the Association.

— Mr. PRETORIAN (*Roumanian State Railways*) asked that the method of carrying out the postal vote shall be laid down. It was understood that a vote should be proceeded with immediately after the close of the Congress, and that the voting should terminate six months after the closing of the Congress. The exact text was as follows :

« The proposed modification shall be voted on and shall be considered adopted if carried by an absolute majority of the delegates present at the General Meeting.

« The modification is only definitely adopted after a postal vote which the Commission shall arrange for, by a circular sent out during the month following the closing of the Congress. In this voting every Administration, Government or Organisation taking part in the Association shall have a number of votes equal to that of the

delegates to which it has a right. The voting is closed at the expiration of six months after the close of the Congress. Those modifications only shall be adopted which have received two-thirds of the votes delivered at the Headquarters of the Permanent Commission before the expiry of this period. »

— Carried.

(*The statutes as revised up to date as the result of the decisions taken by the General Meeting are reproduced hereafter.* [See p. 2469].)

6) The meeting-place for the next session.

Mr. Ghilain, *general secretary,* explained the position of the negociations with the Spanish Government.

Mr. Gil Clemente, delegate of the Spanish Government, stated that Spain would be very happy to welcome the 11th session of the Congress at Madrid in 1930. His remarks were warmly applauded by the whole meeting, and as there were no other suggestions it was decided that the 11th session should be held at Madrid in 1930.

An official acceptance will be conveyed through diplomatic channels.

7) Auditing of accounts. Appointment of auditors.

Mr. Ghilain, *general secretary,* read the report of the auditors on the accounts of 1910 to 1922. The report was approved.

He then handed in the provisional accounts for the period from 1922 to 31 May 1925.

— The Meeting appointed as honorary auditors of this latter account, Mr. Barriol, Chief of the Accountant's Department of the Paris-Lyons-Mediterranean Railway, and Sir Henry Fowler, Deputy Chief Mechanical Engineer, London Midland & Scottish Railway.

8) Discussion of the final summaries adopted by the sections.

Mr. Ghilain, *general secretary,* then read the reports of the sections relating to questions II, V, VI, VII, VIII and XV.

The proposed final summaries on these questions not giving rise to any discussion, were ratified by the meeting.

As regards question XII. A slight modification in the English text proposed by Sir Henry Fowler, *general secretary* was adopted.

— The French text was adopted.

CLOSURE OF THE SESSION

Sir Evelyn Cecil then delivered the following speech :

« Now, Gentlemen, we have concluded the work of the tenth session of the International Railway Congress, and I believe I am expressing the view of all who have taken an active part in the discussions, or who have merely been present, when I say that we have every reason to be satisfied with the results. The attendance of delegates from all parts of the world, so well referred to by His Royal Highness the Duke of York at the Opening Ceremony as extending from China to Peru, has been exceptionally remarkable; the reports so carefully prepared by the gentlemen in charge of the many subjects have been quite exceptionally interesting; and the opportunities gained by the delegates of personal intercourse with their colleagues from all parts of the world will, I think, be of the greatest possible advantage to all concerned.

« I wish to take this opportunity of thanking His Royal Highness the Duke of York for so kindly undertaking the duties of President of this Congress, also my colleague Viscount Churchill, our Chairman, and all those who have so admirably contributed towards bringing the Congress to a successful conclusion. Our thanks also are due to His Majesty's Government and to the Railway Companies' Association; and we have been particularly glad to welcome here Messrs. Foulon, Colson, Ghilain and Holemans and all the delegates and officials connected with our Congress.

« Many of you will now, at the conclusion of your labours, take part in the Centenary celebrations at Darlington, and incidentally be able to visit some of the most interesting of our industrial centres, as well as to enjoy those beauties of nature which this country, especially at this time of the year and under favourable climatic conditions, is able to offer.

« I will express to you all my best wishes for continued activity, mutual work and friendship, and scientific research, which are the objects of this Association, and which I feel this meeting has very successfully attained. I trust that during the years which will intervene before we meet again at Madrid, the world of railways will continue to show marked improvements in all the scientific character of its work of improving for the benefit of the public the means of communication and transport throughout the world, and to work together in common co-operation for the better understanding of nations and mutual goodwill. » (*Applause.*)

Mr. Foulon, president of the Permanent Commission, replied as follows :

« Gentlemen,

« The work of the Congress has come to an end. The Permanent Commission

is pleased that such interesting discussions have taken place at the Sectional Meetings, and have resulted in the suggestions which you have just approved. These will be carefully considered by all Railway Administrations.

« My own remaining duties are agreeable ones. I have first of all to repeat the expression of our respectful gratitude to H. M. The King, and the Royal Family for the great interest they have shown in the Congress. I must also renew our thanks to His Majesty's Government, which have left nothing undone to ensure the success of the Congress, and above all, to Lieut. Col. Wilfred Ashley, the Minister of Transport, who both in his private and his public capacity, has given us so cordial a welcome. I should also like to associate with our tribute of thanks, the name of Mrs. Ashley, whose charming kindness has been so gracious. There are, furthermore, the great British Railway Companies, who have organised our meetings in so masterly a manner, and who have expended equal care on the arrangements for the memorable fêtes and receptions which we have enjoyed. To all these, in the name of the whole Congress, I tender our warmest and most sincere thanks.

« In emphasizing the great success of the session, both as regards its meetings and its excursions, I must pay tribute to the local Organising Committee, and especially to Sir Henry Fowler, general secretary, and to Messrs. Cane and Marriott, secretaries, as well as to their indefatigable staff. By the organising ability which they have displayed, and by their unremitting attention to difficult duties, they have deserved well of the Congress, and in your name I thank them warmly, one and all.

« In thanking the president for his very kind remarks, it is my pleasant duty to draw attention to the part taken in the preparations for the Congress by its very active general secretary, Mr. Ghilain, its devoted secretary-treasurer, Mr. Holemans, and their colleagues who have spared neither time nor trouble for months past in making all the necessary arrangements.

« In closing the session, I would ask you, Gentlemen, to show your appreciation of the way in which Viscount Churchill, president of the Congress, and Sir Evelyn Cecil and Mr. Behrens, vice-presidents, have carried out their duties in connection with the work of the session. » (*Applause.*)

Sir Evelyn Cecil declared the session as closed and expressed the wish that he might be able to again meet all the delegates at the Madrid session.

RULES AND REGULATIONS

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

JULY 1925

Objects, headquarters and constitution of the Association.

ARTICLE 1. — The object of the International Railway Congress Association is to facilitate the progress and development of railways by the holding of periodical Congresses and by means of publications.

The headquarters of the Association are at Brussels.

ARTICLE 2. — The Association is composed of State Railway Administrations, and of Administrations directly concerned with the working of railways of public utility in countries which have joined the Association.

It is composed of the Railway Administrations included in the list which has been published in the *Bulletin of the Railway Congress* for September 1922, p. 1274.

The Governments of the countries to which the Association extends may also join the Association.

The list of these countries (see appendix) may be altered by a decision of the Congress as laid down by articles 20, 21 and 22, hereinafter.

International organisations which deal essentially with railway operation may be admitted as adherents of the Association, as may also National Unions formed of administrations operating at least 5 000 kilometres (3 100 miles) of railways not belonging to the Association.

Permanent Commission.

ARTICLE 3. — The Association acts through a Permanent Commission composed of members nominated according to article 6.

ARTICLE 4. — The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association and of the participating Organisations subject to ratification by the next Congress.

It has power to arrange for the admission of these Organisations and of Railway Administrations who apply, subject to a written report prepared by a member nominated in each case by the President.

The only Railway Administrations who may be admitted to the Association, beyond those who constituted it in 1922, are those whose principal business is the running of railways worked by mechanical traction, whether owned or leased by a public authority, open for public traffic and having a length of at least 100 kilometres (62 miles) open for traffic and average receipts per annum, over the last three years, of at least two million gold francs (1).

Administrations cease to belong to the Association if they fall within either of the following categories :

a) Undertakings which enter into liquida-

(1) The total receipts for each year in gold francs is calculated, where the actual receipts are in paper money having legal currency, by expressing the receipts in pounds sterling in accordance with the rate of exchange in force on the first day of the year in question, and taking the pound sterling as being equal to 25 gold francs.

In calculating the length of line, sections of mountain railway worked by special methods of haulage are taken as equivalent to twice their length.

tion or default and Railway Administrations which cease to operate their lines directly in the public service;

b) Members who have not paid their subscriptions for more than two years and who, having been duly notified, have not paid the arrears;

c) Railway Administrations admitted subsequent to the formation of the Association in 1922 which no longer fulfil the conditions laid down in the 3rd paragraph of this article.

The admission of an Administration in a State which itself is only provisionally included in the Association, under the terms of the 1st paragraph of this article, remains provisional until the admission of the State itself is confirmed.

ARTICLE 5. — The Commission shall organise the Congress meetings, prepare an agenda for discussion, be responsible for their preliminary treatment, edit and publish reports for the discussions, draw up a balance sheet, fix, subject to article 17, the amount of the annual subscriptions, be responsible for the finances, and set on foot any investigations and issue any reports or other publications which will, in its judgment, further the objects of the Association.

ARTICLE 6. — The Permanent Commission shall be composed of ex-presidents of the sessions of the Congress, ex-officio members and elected members, the number of which shall be fixed by each Congress.

The elected members shall be, as far as possible, chosen to represent the different nations. Under no circumstances shall any one nation have more than nine elected members.

One third shall retire at each Congress and shall be eligible for re-election.

Members who have ceased to hold office of any kind, so that they are no longer attached to the railway service of an adherent Government, to an adherent Organisation or to a participating Administration which qualified them at the time of their election, shall cease to be members of the Permanent Commission. It shall be the duty of such a member at once to inform the president when he retired. The Permanent Commission may, upon the application of five members, with the consent of the majority of all its members consulted by letter, ask him to remain until the next Congress.

The Commission shall always have the power to complete its number by co-opting delegates of the participating Administrations and adherent Governments. In this case a final election shall be made at the following Congress.

When the place of meeting of a Congress has been fixed, the Permanent Commission shall have power to co-opt as temporary members representatives of the country in which the Congress is to be held.

ARTICLE 7. — The Permanent Commission shall elect from among its members a president and two vice-presidents at its first meeting after each Congress of the Association.

The president and one of the vice-presidents shall be chosen from the Belgian members.

The Commission shall appoint a general secretary, a secretary-treasurer and secretaries. As such they shall have the right to attend the meetings in a consultative capacity.

The Commission shall be summoned by the President when the business of the Association requires it, but in any case at least once a year.

A meeting may be held when demanded by any five members.

Questions shall be decided by the votes of the majority of members present. If the votes are equal the Chairman shall have the casting vote.

Minutes shall be kept of the proceedings of the Commission. Nine members shall form a quorum.

If at a first meeting this number is not present the meeting shall be adjourned for not longer than one month, when it shall then be considered valid whatever may be the number of members present.

ARTICLE 8. — The Association shall be represented in Courts of Justice and in all civil actions by the president, or in the event of

his being unable to attend, by the general secretary of the Permanent Commission.

Executive Committee.

ARTICLE 9. — At its first meeting after a Congress the Permanent Commission shall nominate three of its members, who, with the president and the vice-presidents of the Commission, shall form an Executive Committee.

The president of the Permanent Commission shall also be president of the Executive Committee.

The general secretary, the secretary-treasurer and the secretaries of the Commission shall be members of the Committee, and shall have the right to take part in discussions, but not to vote.

The members of the Executive Committee shall hold office for a period equal to the interval between two Congresses. They shall be eligible for re-election.

The Executive Committee shall meet at the instigation of the president on his own authority or on the requisition of three members.

The Committee shall be responsible for the management of current affairs and for financial business; also for superintending and managing investigations, reports and publications; for the editing of the *Bulletin* and for the care of the library and archives. It shall decide as to printing in whole or in part the reports and other documents submitted to a Congress, the circulation of which it regards as necessary to facilitate the discussions. It shall be the duty of the Committee to furnish members of the Association with such special information as they may require.

The Committee shall have the right to appoint and to dismiss the staff.

The carrying out of the decisions of the Committee is entrusted to the president and the general secretary.

Congresses.

ARTICLE 10. — At each Congress the Association shall fix the time and place for the following Congress.

The Permanent Commission may alter such arrangements under exceptional circumstances.

ARTICLE 11. — The following shall have a right to attend the meetings :

1° The members of the Permanent Commission, the secretaries and the secretary-treasurer;

2° Delegates appointed by the participating administrations and adherent Governments and Organisations.

These must belong to the regular and permanent staff of the delegating Administration;

3° The secretaries of sections, and the reporters appointed by the Permanent Commission or by the Executive Committee to report on the items on the agenda.

ARTICLE 12. — The participating Railway Administrations shall be entitled to nominate a number of delegates in proportion to the mileage of their system in the following ratio :

One delegate for lines of not more than 200 km. (124 miles);

Two delegates for lines of 200 to 500 km. (124 to 311 miles);

One additional delegate for each additional 500 km. (311 miles) or fraction thereof above 500 up to 3 000 km. (1 864 miles);

One additional delegate for each additional 1 000 km. (621 miles) or fraction thereof above 3 000 up to 6 000 km. (1 864 up to 3 728 miles);

One additional delegate per 2 000 km. (1 242 miles) or fraction thereof above 6 000 up to 10 000 km. (3 728 up to 6 214 miles);

One additional delegate per 4 000 km. (2 485 miles) or fraction thereof above 10 000 km. (6 214 miles).

The adherent Governments and Organisations may nominate delegates to a maximum number of 10 in the proportion of one delegate for each 100 gold francs (1) subscription up to 500 gold francs, and one additional delegate for each 250 gold francs over 500 gold francs.

The maximum figures quoted above do not include those members who take part in the Congresses in accordance with the 1st and 3rd paragraphs of article 11, and whom the participating administrations, or adherent Govern-

(1) See note (1) to article 4.

ments and Organisations include amongst their delegates.

All delegates participate in the Congresses with equal rights.

ARTICLE 13. — At the opening of each Congress, the officers of the Permanent Commission shall hold office temporarily, and the Congress immediately elect its own officers as follows :

1° One or more honorary presidents and vice-presidents;

2° One president;

3° One or more general secretaries and one or more assistant secretaries.

The presidents of sections, elected as explained in article 14 following, shall also be included.

The delegate nominated first by each government shall be an ex-officio vice-president.

All officers shall be appointed for the duration of the session.

The election shall take place according to the rules laid down in article 16, paragraph 6. The duties of the officers shall be those laid down by standing orders adopted by deliberative assemblies for the conduct of their proceedings.

After the appointment of the officers, the Congress shall resolve itself into sections, according to the arrangements of items on the agenda submitted by the Permanent Commission.

A member may enter his name for more than one section.

The Congress may also appoint special committees to investigate certain questions.

ARTICLE 14. — Each section or committee shall appoint its own officers consisting of :

1° a president;

2° one or more vice-presidents;

3° one or more principal secretaries and secretaries.

The principal secretaries of each section or committee, however, shall be nominated by the Permanent Commission.

The sections and the special committees shall cease with the termination of each session.

ARTICLE 15. — The discussions of the Congress shall be confined to the questions set down in the agenda for the session by the Permanent Commission. The latter may receive suggestions, either as regards the inclusion of a question or relating to a particular question already raised by participants or adherents.

A reporter, appointed by the Commission, shall prepare a brief outline of each question placed on the agenda, together with a resume of the documents he has been furnished with; he will not draw up the final summary.

No question shall be discussed at a general meeting without having been first considered by a section or special committee.

ARTICLE 16. — The discussions shall be conducted in French and in the language of the country in which the Congress is held. Speeches in any other language shall be translated into French.

The minutes and reports shall be drawn up in French, but speakers on demand shall be entitled to have their original words reproduced.

The officials of the respective sections shall draw up an abstract of the discussions setting forth the various opinions expressed in the section. After receiving the approval of the section these abstracts shall be submitted to the general meeting. They shall then be inserted in the minutes after having been completed by the addition, if necessary, of any new opinions expressed at the general meeting itself.

The Congress shall not vote except on questions of management or organisation.

On these special questions, the votes of the majority of the members present shall be taken by members rising in their places. If there is any doubt the votes shall be counted. A roll call shall not be held except at the request of not less than twelve members.

Subscriptions and auditing of accounts.

ARTICLE 17. — The expenses of the Congresses, of the Permanent Commission and of the Executive Committee shall be covered by:

1° The annual subscriptions of members;

2° Subsidies and other casual receipts.

The annual subscription shall consist of :

a) In the case of adherent Governments and Organisations, an amount fixed by themselves, which in the case of adherent Organisations shall not be less than 100 gold francs (1) ;

b) For the participating administrations, a fixed sum of 100 gold francs (1), plus a sum proportionate to the length of the system. This variable sum is fixed by the Permanent Commission, but may not exceed the fifth of a gold franc per kilometre.

The financial year shall begin on the 1 January.

ARTICLE 18. — Payment of the subscriptions entitles participating Administrations, Governments and adherent Organisations to receive free as many copies of reports of the proceedings and other publications as the number of their delegates.

ARTICLE 19. — The Permanent Commission shall present to each Congress a report on the financial position. The Congress shall appoint two auditors to pass the accounts.

Revision of the constitution, dissolution and liquidation.

ARTICLE 20. — The rules may be revised by the Congress on the proposal of the Permanent Commission, due notice being given to the participants and adherents by a letter sent out at least two months before the opening of the session.

Proposals for modifications put forward by participants or adherents must reach the Permanent Commission at least six months before the opening of the session. If they are adopted by the Commission, they are submitted to the Congress by means of a report sent out by the Commission which should be despatched to the participants and adherents at least two months before the opening of the session.

If the Permanent Commission does not accept a proposed modification, it shall not be submitted to the Congress, unless it is supported in writing by participating administrations or adherent Governments or Organisations entitled to be represented by 100 delegates at the Congress. In this case the proposition is submitted to the participants and adherents by a letter from the Permanent Commission sent out at least two months before the opening of the session.

ARTICLE 21. — Every proposal for amending the rules shall be discussed by the Congress on a report of a special committee presided over by the President of the Permanent Commission, or by his delegate and composed of eleven members, as follows:

a) the President of the Permanent Commission or his delegate;

b) four members delegated by the Permanent Commission;

c) one delegate from each of the five sections which form the Congress, this delegate being chosen after the discussion of the suggestion by the section;

d) one delegate representing the authors of the suggestion.

ARTICLE 22. — The proposed modification shall only be considered if it is supported by the clear majority of the delegates present at the general meeting.

The modification shall not be finally adopted until a written ballot has been taken, which shall be called for by a circular letter sent out by the Permanent Commission during the month following the termination of the session of the Congress. In this ballot each Administration, Government or Organisation belonging to the Association shall have a number of votes equal to the number of the delegates to which it is entitled.

The ballot shall be closed six months after the termination of the session of the Congress.

Only those modifications will be adopted which are supported by two-thirds of the votes received at headquarters of the Permanent Commission by the end of this period.

The results of the ballot will be published in the monthly *Bulletin* of the Association.

(1) See note (1) to article 4.

ARTICLE 23. — Adherent Governments and participating Administrations constituting the Association pledge themselves to promote the meetings of the Congress and the work of the Permanent Commission.

ARTICLE 24. — The Association may be dissolved only by a three quarters majority, on a postal vote from the participating Administrations, each one having a number of votes equal to that of the delegates to which it is entitled.

ARTICLE 25. — In the event of dissolution, the Permanent Commission shall have authority to arrange the liquidation.

The assets of the Association are to be distributed by its agency among works conforming with the objects of the Association or among philanthropic works in connection with railways.

ARTICLE 26. — In no circumstances shall participating Administrations and adherent Governments, who for any reason have ceased to belong to the Association, have any claim on the assets of the Association.

APPENDIX.

LIST OF COUNTRIES

included in the International Railway Congress Association.

Argentine;
Belgium and Colony;
Bolivia;
Brazil;
Chili;
China;
Costa-Rica;
Cuba;
Czechoslovakia;
Denmark;
Dominica;
Ecuador;
Egypt;
Finland;
France, Algeria, Tunisia, Colonies and Protectorates;
Great Britain and North of Ireland, India, Dominions, Protectorates and Colonies;
Greece;
Hayti;
Holland and Colonies;
Italy;
Japan;
Luxemburg;
Mexico;
Nicaragua;
Norway;
Paraguay;
Peru;
Poland;
Portugal and Colonies;
Roumania;
Salvador;
Siam;
Spain;
Sweden;
Switzerland;
United States of America;
Uruguay;
Yugo-Slavia.

LIST OF MEMBERS OF THE PERMANENT COMMISSION

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

elected at the General Meeting of the Congress on the 1st July 1925, and at the meeting held by the Permanent Commission on the same date (art. 6 and 7 of the statutes).

President :

E. **Foulon** (2), administrateur-directeur général des chemins de fer de l'Etat belge; rue du Progrès, 74, Bruxelles.

Vice-presidents :

C. **Colson** (1), membre de l'Institut, inspecteur général des ponts et chaussées, vice-président du Conseil d'Etat de France; rue de Laplanche, 2, Paris;

Marchal (1), administrateur des chemins de fer de l'Etat belge; rue de Louvain, 21, Bruxelles.

Members of the Executive Committee :

G. **Behrens** (2), director, London Midland & Scottish Railway; Chepstow street, 20, Manchester;

The Right Hon. Sir Evelyn **Cecil** (3), G. B. E., M. P., privy councillor, director, Southern Railway; Cadogan Square, 2, London, S.W.1;

Griolet (2), vice-président du conseil d'administration de la Compagnie du chemin de fer du Nord français; avenue Henri Martin, 97, Paris.

Ex-presidents of sessions, members ex-officio :

The Right Hon. Viscount **Churchill**, G. C. V. O., chairman, Great Western Railway; Paddington Station, London, W. 2.

R. **de Cornè**, ingénieur, président du conseil supérieur des travaux publics d'Italie; Rome.

Members :

Belgium.

E. **Foulon** (already named);

Marchal (already named);

A. **Braem** (2), administrateur des chemins de fer de l'Etat; rue de Louvain, 17, Bruxelles;

U. **Lamalle** (1), administrateur des chemins de fer de l'Etat; rue de Louvain, 21, Bruxelles;

Jacques (3), administrateur des chemins de fer de l'Etat; rue de Louvain, 17, Bruxelles;

Molle (3), administrateur des chemins de fer de l'Etat; rue de Louvain, 17, Bruxelles;

H. **Caufriez** (3), directeur général de la Société nationale belge des chemins de fer vicinaux; rue de la Science, 14, Bruxelles;

G. **Philippe** (2), inspecteur général des lignes Nord belges; Liége;

P. **Ghilain** (1), ingénieur en chef, inspecteur de direction aux chemins de fer de l'Etat, président de la Commission de réception du matériel et des approvisionnements; rue du Progrès, 74, Bruxelles.

China.

Tsang Ou (1), directeur général adjoint du chemin de fer du Lunghai; rue de Mogador, 5, Paris.

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(1) Retires at the 11th session.
(2) Retires at the 12th session.
(3) Retires at the 13th session.

Denmark.

T. A. **Alstrup** (2), directeur général des chemins de fer de l'Etat; Gl. Kongevej, 1, Copenhague.

Egypt.

Abdul-Hamid Pacha **Soliman** (1), directeur général des chemins de fer, télégraphes et téléphones de l'Etat; Le Caire.

Spain.

A. **Valenciano y Mazerès** (1), ingénieur en chef des ponts et chaussées, sous-directeur général des travaux publics et chef de la section des chemins de fer au Ministère du fomento; Calle de Piamonte, principal derecha, 14, Madrid;

Maristany (2), marquis de l'Argentera, directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante; Estacion de Atocha, Madrid.

United States of America.

D. **Willard** (3), chairman of the Board, American Railway Association, president, Baltimore & Ohio Railroad; Baltimore, Md.;

R. H. **Aishton** (2), president, American Railway Association; South Dearborn Street, 431, Chicago, Ill.;

L. F. **Loree** (2), president, Delaware & Hudson Railroad; Nassau Street, 32, New York City;

W. W. **Atterbury** (3), vice-president, Pennsylvania Railroad System; Broad Street Station, Philadelphia, Pa.

France.

C. **Colson** (already named);

E. **du Castel** (1), conseiller d'Etat, directeur général honoraire des chemins de fer au Ministère des travaux publics; boulevard Saint-Germain, 241, Paris;

M. **Fontaneilles** (1), inspecteur général des ponts et chaussées, président de la section des chemins de fer au conseil général des ponts et chaussées; rue de Sèvres, 4, Paris;

P. **Riboud** (1), directeur de la Compagnie des chemins de fer de l'Est; rue d'Alsace, 21, Paris;

J. R. **Paul** (2), directeur de la Compagnie des chemins de fer du Midi; boulevard Haussmann, 54, Paris (IX^{e});

G. **Griolet** (already named);

P. E. **Javary** (3), directeur de l'exploitation de la Compagnie du chemin de fer du Nord; rue de Dunkerque, 18, Paris;

Margot (2), directeur général de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée; rue Saint-Lazare, 88, Paris;

A. **Mange** (3), directeur de la Compagnie du chemin de fer de Paris à Orléans; rue de Londres, 8, Paris.

Great Britain.

J. R. **Brooke** (3), C. B., permanent secretary, Ministry of Transport; Whitehall Gardens, 6, London, S. W. 1;

The Right Hon. Viscount **Churchill**, G. C. V. O., (already named);

G. **Behrens** (already named);

Sir Guy **Granet** (1), G. B. E., chairman, London Midland & Scottish Railway; Lombard Street, 80, London, E. C. 3;

The Right Hon. H. G. **Burgess** (1), general manager, London Midland & Scottish Railway; Euston Station, London, N. W. 1;

Sir Henry **Fowler** (1), K. B. E., chief mechanical engineer, London Midland & Scottish Railway; Derby.

Sir Ralph Lewis **Wedgwood** (3), C. B., C. M. G., chief general manager, London & North Eastern Railway; King's Cross Station, London, N. 1.;

The Right Hon. Sir Evelyn **Cecil**, G. B. E., M. P. (already named);

Sir Francis **Dent** (2), C. V. O., director, Southern Railway; Porthyfelin, Holyhead.

Canada.

Sir Henry W. **Thornton** (2), chairman and president, Canadian National Railways; Montreal, Que.

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(1) Retires at the 11th session.
(2) Retires at the 12th session.
(3) Retires at the 13th session.

India.

Sir Ernest Albert Seymour **Bell** (2), Kt., C. I. E., Government director of the Indian Railway Companies; India Office, Whitehall, London, S. W. 1.

Italy.

R. **de Cornê** (already named);

A. **Fabris** (3), ingénieur, chef du service du matériel et de la traction des chemins de fer de l'Etat; villa Patrizi, Rome;

F. **Fiori** (3), ingénieur, chef de service principal des chemins de fer de l'Etat; Rome;

R. **Gioppo** (2), ingénieur, inspecteur supérieur à la Direction générale des chemins de fer de l'Etat; Rome;

F. **Tajani** (3), ingénieur, président de la Fédération des transports; via Nirone, 21, Milan.

Japan.

K. **Ikeda** (1), delegate of the Japanese Government Railways; Sentinel House, Southampton Row, London, W. C. 1.

Holland.

L. M. **Barnet Lyon** (2), ingénieur civil, membre du conseil de surveillance des chemins de fer; Statenlaan, 14, La Haye.

Poland.

A. **Frank** (3), ingénieur des ponts et chaussées, inspecteur au Ministère des chemins de fer; Varsovie.

Roumania.

C. **Mereutza** (1), sous-directeur général des chemins de fer roumains; Bucarest.

Sweden.

A. **Granholm** (1), directeur général des chemins de fer de l'Etat; Stockholm.

Switzerland.

Le Dr. R. **Herold** (3), directeur au département fédéral des postes et des chemins de fer; Berne;

Zingg (1), président de la direction générale des Chemins de fer fédéraux; Berne;

G. **Kunz** (3), directeur du chemin de fer Berne-Loetschberg-Simplon; Berne.

Czechoslovakia.

E. **Kejr** (2), ingénieur, conseiller des constructions du département V/1 au Ministère des chemins de fer; Prague.

Administrative Councillor : A. **Braem** (already named).

SECRETARY'S OFFICE : rue du Progrès, 74, Bruxelles.

General Secretary : P. **Ghilain** (already named).

Secretary-Treasurer : Ed. **Holemans,** inspecteur de direction honoraire des chemins de fer de l'Etat belge.

Assistant Secretary-Treasurer :

J. **Habran,** directeur d'administration honoraire des chemins de fer de l'Etat belge.

Assistant Secretaries :

R. **Desprets,** ingénieur principal aux chemins de fer de l'Etat belge;

E. **Minsart,** ingénieur principal aux chemins de fer de l'Etat belge;

J. P. **Van Rijn,** ingénieur principal aux chemins de fer de l'Etat belge.

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(1) Retires at the 11th session.
(2) Retires at the 12th session.
(3) Retires at the 13th session.

APPENDICES

BANQUET AT CRYSTAL PALACE

given to the members of the Congress by the Railway Companies' Association of Great Britain.

On Thursday evening, the 25th June, a banquet was given by the Railway Companies' Association of Great Britain to the delegates to the Congress at the Crystal Palace.

The guests were conveyed to the Crystal Palace by four special trains running from Victoria station to the High Level station from which there was a covered way into the building itself.

The dinner was served in the nave, the flags of all the adherent nations being displayed at the back of the top table.

Accommodation was provided for between 1 300 and 1 400 guests. The seating arrangements consisted of a long top table with about 100 seats, and a number of oblong tables, each holding eight. Each table had a central decoration of flowers, surrounding a model of some portion of railway equipment.

The chair was taken by Sir Guy Granet, Chairman of the London Midland & Scottish Railway, Chairman of the Railway Companies' Association of Great Britain and a member of the Permanent Commission of the Congress, supported by Mr. Wm. Whitelaw, Chairman of the London & North Eastern Railway and Vice-President of the said Association.

On the right of Sir Guy Granet were seated :

Mr. Foulon, President of the Permanent Commission; Lieut.-Colonel The Right Hon. Wilfred Ashley, M. P., Minister of Transport; Mr. Colson, Vice-President of the Permanent Commission, and Brig.-General The Hon. Everard Baring, Chairman of the Southern Railway (Great Britain);

and on his left were : Professor F. d'Alessio, first delegate of the Italian Government; Viscount Churchill, President of the Tenth Session of the Congress; The Right Hon. Sir Philip Cunliffe-Lister, M. P., President of the Board of Trade, and Colonel E. A. Simmons, delegate of the United States Government.

On the right of Mr. W. Whitelaw were seated :

Mr. T. Ito, first delegate of the Japanese Government; Mr. E. B. Fielden, M. P., Deputy Chairman of the London Midland & Scottish Railway; Mr. Braem, member of the Permanent Commission, and Mr. G. W. E. Loder, Deputy Chairman of the Southern Railway (Great Britain);

and on his left were: Mr. Barnet Lyon, member of the Permanent Commission; Sir S. Ernest Palmer, Bart., Deputy Chairman of the directors of the Great Western Railway (Great Britain); Mr. Marchal, Vice-President of the Permanent Commission, and Mr. Douglas Vickers, director of the London Midland & Scottish Railway.

Banquet at the Crystal Palace, 25 June 1925.

At the top table were the other members of the Permanent Commission, the principal delegates of the adherent Governments and also certain distinguished guests.

An organ recital was given during the banquet. At the conclusion, the President, Sir Guy Granet, proposed the health of His Majesty King George, which was received with enthusiasm.

The following speeches were made :

Speech
by The Right Hon. Sir Philip Cunliffe-Lister, President of the Board of Trade.

Mr. Chairman,
My Lords,
Ladies
and Gentlemen,

I count it, as a member of His Majesty's Government, a great honour that you have invited me to propose the toast of yourselves which, however many toasts there were on the list, must obviously be the most important toast of the evening, the toast of « Success to the International Railway Congress ».

Those people who have time to engage in speculative intellectual exercises have recently started a thesis of whether or not one is too old at 40; rather unpleasant for myself, but rather a pertinent question, I understand, to ask of you this year. Well, they need not speculate any more, for the International Railway Congress, in its fortieth year, answers once and for all in the negative the suggestion that one can be too old at 40. And I carry it a stage, or a good many stages, further. We make a claim this year, on behalf of British railways, that not only are we not too old at 40 but we are not too old at 100, not too old at 100 to render efficient service to meet difficult situations, not too old to learn day by day everything that any country in its science and in its development has to teach us, and to apply it in perhaps the most important of all the public services, and I know that I speak the sincere sentiments of everyone here who is connected with railway administration in this country when I say that they count it not only a pleasant compliment but a real honour that you have fixed this important Congress in this country in this our railway centenary year.

I give you to-night this toast not only with sincere good wishes, but with a very keen appreciation of the value of this Congress. In this country every member of the travelling public assumes, as of right, that he is able to teach any railway company anything. He also assumes with equal right, that he is able to get any information, relevant or irrelevant, from any member of the staff of any railway company, from a chairman down to the youngest porter. I am bound to say *she* generally gets it. But I am not going to inflict upon you any teaching to-night upon your own subjects. I want only to say why I — wholly inexpert in the technicalities of railway matters, very deeply interested, however, in what railways have to do for the whole of the public they serve, and, more than that, as deeply sensible as anyone concerned in any country with either trade or a Government must be, of the economic needs of the world to-day — regard this Congress as of real value and deserving of our good wishes.

In the first place I believe it to be of immense value that those who in different lands and in different circumstances are engaged in facing common problems should come together and pool their common experience and their common knowledge. I am quite certain that as the years go on, whether it is in railway work or whether it is in any line of business, men are coming more and more to the conviction that isolation does not pay, that really it pays not only the whole but every part of the whole to pool, as far as they can, common information, common knowledge, common scientific and practical attainments. That is why I welcome, as any man interested in the development of the railways and the trade of his own country must welcome, the continuation of this Congress and its presence in this country.

But I welcome it for another reason. Apart altogether from the specific value which is attained by men of great administrative and technical experience meeting to discuss their

common problems, there is a tremendous added value in those who are engaged in one enterprise or another in the different countries of the world meeting together at all.

After a cataclysmic struggle there came upon the world the conviction that, if that was to be avoided in the future, there had to come into the relationship of nations a new conception of common interest, of co-partnership, which had been absent before. Well, you may put that into a Treaty, you may enshrine that ideal in the grandest of language, you may compel it by the strictest international Covenants; but it will be of no lasting value, it will be of no permanent force, unless that conception, that attitude of mind, that determination, is present in the daily lives of men, in their businesses and in their different countries. It is in Conferences of this kind, particularly if they be continuous, if they go on from year to year, where nations meet on problems of their ordinary practical daily life, and in the intervening time carry out something which has been the result of common discussion, that you get perhaps more than in anything else the practical day-to-day realisation of the common interests and the real interdependence of the peoples of our different countries. I do not think that any undertaking more than a railway, or better than a railway, can illustrate or indeed can practise that common need. Trade is the greatest cement between peoples. I suppose that really nothing does more to break down the barriers between countries than the physical interconnection of the network of the railways which interlink them. It is always the common interests of railways to stand for interconnecting trade, to stand for the breaking down of barriers. I remember at Genoa I had some part in starting again the International Railway Union. We started it keeping politics out altogether. That was why it succeeded. There was at the back of my mind this, too, that, if the railway managements of Europe can get together to meet their common problems, that will do as much as anything else in the world to make nations think co-operatively and not individually. It is therefore with that thought in my mind that you, studying together your railway problems, carrying out that linking-up work of railway administration, can probably do as much as, if not more than, any other body of men can do to link nations rather than separate them, that I wish to-night to this Congress every success.

I am doubly pleased in that I am able to couple with this toast the name of Mr. Foulon, the President of the Permanent Commission. Mr. Foulon is an admirable example of the man of action who combines great technical training and knowledge with great commercial experience. Both are good; when they are married together nothing can stand against them, and Mr. Foulon's country has widely realised and made use of that felicitous combination. We, I believe, I am sure, are all grateful to Mr. Foulon that, at a time when there must be a tremendous demand upon his abilities and his activities in the great work with which he is charged in his own country, he has found time not merely to be associated with the work of this Congress, but to give so much time to the Permanent Commission. It is that work on the permanent body that makes a congress, particularly a great International Congress of this kind, when it comes together, effective. To-day in the success of this Congress we are reaping the fruits of Mr. Foulon's labours.

Therefore I give you with all sincerity the toast of « Success to the International Railway Congress ». Long may it live; may its influence be as wide as its membership is representative, and long may it enjoy not only the association but the services of Mr. Foulon!

The toast was enthusiastically received.

Speech by Mr. Foulon.

Mr. President,
Ladies
and Gentlemen,

Please permit me, first of all, to thank with all my heart the President of the Board of Trade for the extremely kind remarks which he has been good enough to address to me. I am very touched by them and am grateful to him.

The President of the Board of Trade has emphasised, and rightly, the happy results of and the urgent necessity for a *rapprochement* between the Railway Administrations by means of Conferences and International Congresses. The same problems are the order of the day in all countries, problems of various orders, social, technical, and economic, and they need light thrown on them by the savants and technical experts of all nations. I am with the President of the Board of Trade when he expresses a wish for collaboration growing ever closer and closer between the railways in the realms of science and economics.

Ladies and gentlemen, within a few days Great Britain will celebrate with justifiable pride the centenary of putting into work of the first railway in the world. (*Applause.*) We share the emotion which so memorable and so great an event arouses in the hearts of our English friends, and what a long road has beeen traversed since Stephenson's invention! Great Britain can pride herself on occupying to-day through her industrial and commercial power one of the foremost places in the world. We admire the gigantic establishments with their wonderful technical installations of her railways and her ports. We have visited with the greatest interest the enormous locomotive shops of the Great Western Railway Company at Swindon, shops which are endowed with the most powerful modern machinery, and we shall have learned from our visit the most valuable lessons.

Ladies and gentlemen, I offer my best thanks in the name of the Railway Congress to the President of the Board of Trade and to the great railway companies of England for all they have done with so much zeal and so much munificence for the success of the Tenth Session. We shall retain a lasting and grateful memory of our stay in Great Britain.

I propose, ladies and gentlemen, that we raise our glasses and drink to the prosperity of Great Britain and her railways, which are a source of the greatest admiration to us. (*Prolonged applause.*)

Speech by Sir Guy Granet.

My Lords,
Ladies
and Gentlemen,

I now have the very pleasant task to perform of proposing the toast of « Our Guests ». It is a very pleasant task and it is a very easy one, because I know that I am the interpreter of the feelings of every British railwayman, whether he is present here to-night or elsewhere, in bidding welcome to our friends from overseas.

But I confess that I find it difficult to express to our friends adequately, not only the pleasure that we feel at their presence to-day, but how much we value their coming, how much we appreciate their coming, and to what an extent we depend upon their opinions and advice in the many problems that we have to consider. And, finally, I speak on behalf, again, of all British railwaymen when I try to express to them, altogether inadequately I am afraid, how we really long to be able, in some small degree, to show our recognition of the innumerable kindnesses, the inexhaustible courtesy and civility, which we receive whenever we go and visit them in their own countries.

We are a band of brothers, we are a fraternity engaged in the same work wherever we may be, with the same objects, with the same instruments, practically with the same problems to face; and it is always an inspiration to us when we come into contact with our friends from overseas, and we feel that we never go empty away.

I sincerely pray that this Congress may be no less successful than its forerunners, that new friendships may be formed — they certainly will be formed — and that old friendships may be cemented.

Now, Gentlemen, just one word about our guests. We have here two gentlemen present. I allude to our friends The President of the Board of Trade, Sir Philip Cunliffe-Lister, and to the Minister of Transport, Colonel Ashley. I want to say to them, on behalf of all of us, that we welcome them, whatever their status may be, as guests, and as honoured guests.

I just want to say one more word about them. I suppose in their official capacity they stand for what we railwaymen, wherever we are, all over the world, hate most; they stand for Government control, Government regulation, and, so far as we are concerned in this country, with statutory powers and possibly obligations to inflict upon us the duty of answering endless and countless complex interrogatories. But, having said that, I also want to repeat that we welcome their presence to-night, we honour them and we appreciate their having come. I want to say this one thing further. I think that their presence here to-night is symbolical of the extraordinary good feeling, of the sympathy and of the real understanding with which, not only they, but every officer in the Departments over which they preside, carry out their onerous, and I have no doubt irksome, duties, so far as we are concerned.

As far as I am concerned, I would like to ask each of our distinguished guests to say something in reply, but I suppose, that would not be permissible, and, therefore, I will confine myself to saying this, that I think we are extraordinarily fortunate in our being able to couple the Toast that I am proposing with the name of Mr. Colson. Mr. Colson is honoured in his own country; he is honoured in every country which knows a railway, and in this country, where I am glad to say he has found the opportunity of spending a considerable amount of his time, he has earned our special esteem. I will only say in conclusion, not only to Mr. Colson, but to every one of our friends from abroad, that I hope they will repeat their visit, that they will come again soon and often, and they will find themselves among friends whose one object will be to show them that we appreciate their presence and value their sympathy and assistance.

My Lords and Gentlemen, I have the pleasure of giving you the Toast of our Guests, coupled with the name of Mr. Colson.

The toast was enthusiastically received.

Speech by Mr. Colson.

Mr. Chairman,
Ladies
and Gentlemen,

Sir Guy Granet, with an eloquence which demands a reply from me, has given me for the second time the pleasure and honour of thanking our hosts in the name of all the foreigners present to-night for the great and wonderfully organised hospitality which they have extended to us, sparing neither time nor trouble.

I have known this hospitality for a long time, and I have often been the recipient of it, and it must be on this occasion permitted to me to invoke the memory of the eminent master of economics and financial questions on railway matters who was the first to put me in touch with the heads of the English railway systems, the friend whom we lost shortly before the Congress — I refer to Sir William Acworth.

Old friendships which I had made in England have been renewed, like many of those which united a great number of the nations represented here through trials which have been undergone in common in the great struggle for the liberty of the world, a struggle to which allusion can be made before the Congress for perhaps the last time without wounding the susceptibilities of any of the members present.

To-day it is a labour of peace which has reunited us on the occasion of the Centenary of the first railway, but we should not be giving this anniversary its full weight of importance if we regarded it without placing it in its proper setting, that is to say without remembering the other great creations of England which dominate our whole civilisation. It is certain that there is no branch of modern culture in which the native land of Shakespeare and Newton, to say nothing of more recent names such as Maxwell and Lord Kelvin, has not largely participated. But there are two essential features in contemporary progress of which England is truly the mother and the initiator. The first, which is not our province, is political liberty in the only form

in which it can be realised in great modern communities, the Parliamentary regime. England practised it about two centuries before all other nations, and has continued to practice it with success. She has thus opened the way through which the majority of countries have since followed her with more or less success.

The second creation which we owe to England, that which has increased the well-being of humanity for a century, to a degree which has perhaps surpassed anything that could have been realised in ten centuries before, is the great industry with its principal instrument the steam-engine. England created it a century and a half ago, and invented the two principal things to which it could be applied, thanks to which the whole world has become a single market — I refer to the steamboat and the locomotive.

England has brought about this miracle, which has perhaps caused a certain astonishment and has also scandalised geometricians, that is to say, she has at the same time increased the surface of the world and diminished its dimensions.

She has increased the surface of the globe by permitting European civilisation to bring into play the enormous area of the new world where, up till then, it had only been possible to penetrate at great outlay of time and money, and then only to touch the borders.

She has at the same time diminished the dimensions of the world by furnishing mankind with the means of accelerating communication on land and sea to an extent which is accentuated more and more from day to day, surpassing anything that our ancestors could have imagined before the event of which we are now celebrating the Centenary.

The world has thus become a single market, and England has become the centre of this market, seeing that on the one hand she shone throughout the whole world by the might of her Mercantile Marine, the strength of which alone exceeded at times that of all other countries, and that, on the other hand the business men of the City had beeen able to concentrate the movements of capital and a great part of the exchanges of the whole universe in that little area in which are gathered the leading men of business of the world. That England has been able to rise to this position is due to the fact that the whole world knew that not only in public affairs, but also in private matters, the word of an Englishman has always been as good as gold.

That she has been able to retain to-day this central position is due to the fact that she has made progress for which we others, more severely tried by the misfortunes of the war, envy her greatly. She has just decided that the pound sterling shall return to its gold value. We envy her for her success in this, we who are faced with greater difficulties, but at the same time we admire her courage, thanks to which England has been enabled to re-establish with metal currency the security of those relations which permit her to take again her former place.

That, ladies and gentlemen, is why, in thanking our hosts, the great Railway Companies and the English authorities, for the welcome which they have given us, I raise my glass to the honour of Great Britain, the creator of political liberty and industry, the mother of railways, and the centre of the world's commerce. (*Prolonged applause.*)

The Chairman briefly replied.

Mr. A. Braem, member of the Permanent Commission, proposed the Toast of « The Chairman », Sir Guy Granet, which was enthusiastically received.

The Chairman thanked him very warmly.

The guests then viewed a display of fireworks held in their honour in the grounds of the Palace.

They subsequently returned to Victoria Station by four special trains.

SUMMARY OF VISITS OF WORKS, EXCURSIONS AND RECEPTIONS

WEDNESDAY, 24 JUNE.

Excursion No. 1. — London to the Great Western Railway Company's Locomotive Works, Swindon.

Delegates and ladies to the number of 150, accompanied by Mr. A. Maynard, a member of the Arrangements Committee, left Paddington Station by special train at 1.10 p. m. for Swindon. Luncheon was served on the outward journey.

The President, Lord Churchill, accompanied the party, who were met on arrival by Mr. C. B. Collett, C.B.E., chief mechanical engineer to the Great Western Railway Company, and his assistant, Mr. W. A. Stanier, and were conducted round the Works. Special interpreters were provided.

The party left Swindon at 5.25 p. m., tea and coffee being served on the train, and arrived at Paddington at 6.40 p. m.

A very excellently produced souvenir in English, with copies in French, was presented to the delegates containing information with regard to the Great Western Railway, and an illustrated description of the Works.

Excursion No. 2. — London to Canterbury.

Delegates and ladies to the number of 125, accompanied by Mr. F. A. Brant, a member of the Arrangements Committee, left Charing Cross by special train at 1.15 p. m. for a visit to Canterbury. Luncheon was served on the train, and they were welcomed on arrival at the station by His Worship the Mayor, Alderman G. Pope, Alderman Anderson and other City Officials.

The Cathedral was visited, and the party received by Dr. S. Bickersteth and Dr. Cotton. Three parties were conducted round, one party separately for French speaking delegates.

After the inspection of the interior of the building, tea was served in the Chapter House, and a vote of thanks was proposed to the Vice Dean for his kindness in allowing the delegates to view the beautiful Cathedral. This was suitably responded to.

The party entrained at Canterbury West Station at 5.30 p. m., light refreshments being served on the train, which arrived at Charing Cross at 7.35 p. m.

Excursion No. 2A. — London to Oxford.

A visit was paid to Oxford, the party being accompanied by Mr. H. Marriott, C.B.E., joint secretary of the Arrangements Committee, the number of delegates and ladies being 208.

The party left Euston (London Midland & Scottish Railway) by special train at 1.5 p. m. via Bletchley, luncheon was served on the train, and at Oxford the delegates were met by motor buses and guides arranged for by the Oxford Visitor's Society. Owing to the visit of the King to Christ Church College, only Colleges on the other side of the city were visited. These included the New College, Trinity College, and St. John's.

On returning to the station the party was photographed and on the proposal of Mr. Lochett, and seconded by Mr. Margot, a hearty vote of thanks was passed

to the Mayor and Corporation, and to Mr. F. T. Holbrow, who had made the arrangements on behalf of the Oxford Visitors' Society.

The party left Oxford by the Great Western Railway at 5.15 p. m., tea and coffee being served en route, and arrived at Paddington at 6.28 p. m.

Excursion No. 3. — Round City and West End of London.

At the invitation of Messrs Thos. Cook and Son, a visit was paid round the City and the West End of London. The party numbering 150, delegates and ladies, left Birdcage Walk, Westminster, by charabancs at 2.0 p. m. Sir Henry Fowler, K.B.E., LL.D,, chairman of the Arrangements Sub-Committee, accompanied the party.

The itinerary had been laid out with very great care, and included a visit to the City, as far as the Tower of London, and to the West End, to the Museums at Kensington. Unfortunately the weather was wet, this being the only time there had been a downpour during the sittings of the Congress.

The delegates were entertained to tea, by Messrs. Thos. Cook and Son,at Messrs. Lyons' Corner House, Coventry Street. After tea, thanks were expressed to Messrs. Cook & Son by Mr. Zingg for their very kind invitation, to which Mr. Spiller, who has had such long service with Messrs Cook & Son, responded.

The party then completed their journey, Birdcage Walk being reached again at 6.0 p. m.

Concert at Queen's Hall, 26 June.

On Friday evening a highly successful smoking concert, provided by the London & North Eastern Railway, in honour of the delegates of the tenth International Railway Congress, was held at the Queen's Hall, Langham Place, W. About 2 000 were present, and all thoroughly appreciated the musical treat given them.

The artists comprised a full orchestra of 100, and a combined male voice choir numbering 300, who were drawn from the staff of the London & North Eastern Railway at London, Cambridge, Grimsby, Ipswich, King's Lynn, Norwich, Peterborough, York, etc. Colonel Wm. Johnson Galloway, a Director of the London & North Eastern Railway, conducted the items in which they took part. The command that he exercised over so large a number of performers excited general admiration, and many were the comments on the excellence of the performance.

As stated in the programme, the Society is unique, being composed entirely of amateurs, and not relying on any professional assistance. Colonel Galloway would have been flattered had he heard the comments from all parts of the Hall with regard to the orchestra and choir. In certain items, the choir was assisted by Miss Lilian Stiles-Allen and Mr. Peter Dawson, whose solos were thoroughly appreciated.

Before the performance proper, Dr. Stanley Marchant gave a brilliant organ recital, and he also accompanied throughout the concert.

During the interval, Mr. William Whitelaw, Chairman of the London & North Eastern Railway, offered a cordial welcome to the guests, and stated that they were glad of the opportunity of showing the delegates some of the musical talent of this country. He pointed out that the welcome was afforded not only by the Directors, but by men drawn from the Permanent Way, from the Footplate of the Locomotives, and from the Station Platforms, who also wanted to take a part in welcoming those railwaymen who had come from other countries. Some of their entertainers had travelled 200 miles in order to take part in that welcome, and would return during the evening, arriving at their homes in the small hours of the morning. This, however, did not trouble them if they could

but feel that they had taken a personal part in the welcome they all wished to extend. He again wished to say how privileged they felt at the opportunity of entertaining the delegates, and they hoped to do so again at Darlington in the following week.

Mr. FOULON, the President of the Permanent Commission of the International Railway Congress Association, in reply, said that he wished to thank the Directors and Officers, and employees, of the London & North Eastern Railway Company for their courtesy in entertaining them. They had thoroughly enjoyed the music, executed as it was in such a perfect manner, and he wished to congratulate the Company as a whole on the achievement. He was particularly desirous of congratulating Colonel Johnson Galloway, who had done so much to raise the orchestra and choir to such a high state of perfection. He felt that the reason of the high standard of the music which had been offered them was largely due to the opportunity and encouragement given by Colonel Johnson Galloway and the officers of the Company. He felt certain that such social work between all classes of the staff, such as they had seen and heard that evening, was of the greatest benefit to all concerned.

SATURDAY, 27 JUNE.

Excursion No. 4. — London to Windsor Castle.

By the courteous permission of His Majesty the King the delegates visited Windsor Castle on the above date, a Garden Party being held there. Over 1 200 delegates and friends took advantage of this opportunity, travelling by special trains which left Paddington at 1.55 p. m. and 2.5 p. m., and Waterloo at 2.0 p. m.

On arrival, the delegates were shewn through the State Apartments, containing as they do a priceless collection of furniture and articles of high artistic and historical value. Tea was served in the Orangery, whilst music was provided by the Band of H. M. Welsh Guards under the conductorship of Lieut. Andrew Harris, L.R.A.M.

A feature of the excursion was the taking of a group photograph, which includes practically the whole of the Congress delegates, and this has been so successfully reproduced that it will form an interesting memento of the occasion.

The return journey to London was made by trains leaving Windsor at 5.50 p. m. and 6.0 p. m., and arriving at Paddington at 6.20 p. m. and 6.30 p. m., and Waterloo at 6.25 p. m.

SUNDAY 28 JUNE.

Excursion No. 5 (motor)	**Into country, via Guildford.**
— **No. 6** —	— — **Dorking.**
— **No. 6A** —	**To Thames Valley, via Beaconsfield, Maidenhead and Hampton Court.**

Three excursions were arranged by charabancs, which left Birdcage Walk at 2.0 p. m., into the country, *viz.:*

1) Via Guildford;
2) Via Dorking;
3) To Thames Valley, via Beaconsfield, Maidenhead and Hampton Court,

and the various parties were accompanied by :

No. 1 party	Sir Henry Fowler;
No. 2 —	Mr. A. Maynard;
No. 3 —	Mr. A. L. Gibson.

The number of delegates and ladies attending each excursion was :

No. 1 party	247
No. 2 —	90
No. 3 —	112

Tea was served at one of the stopping places en route.

The weather was delightful, and the delegates thoroughly appreciated the opportunity of viewing the English countryside from the road.

The whole of the parties arrived back in London (Birdcage Walk) between 6.30 p. m. and 7.40 p. m.

Excursion No. 6B. — London to Brighton.

Delegates and ladies to the number of 130 left Victoria Station at 2.15 p. m. for an excursion to Brighton; Mr. F. A. Brant, member of the Arrangements Committee, being in charge of the party.

On arrival at the Central Station, Brighton, the party was driven round the town in charabancs, and at the Pavilion a reception was held and tea served in the Dome.

The party left Brighton at 6.25 p. m. and arrived back in London at 7.40 p. m.

MONDAY, 29 JUNE.

The excursions on this day were a repetition, to a certain extent, of those held on Wednesday, the 24 June, and Sunday, the 28 June

Whilst the weather, on Wednesday, the 24 June, was the only time it rained during the whole of the Congress, here, as with all other excursions, it was delightful.

The excursions were as follows :

		Accompanied by	Number attending.
Excursion No. 7	**Swindon**	Mr. A. Maynard.	151
— **No. 8**	**Canterbury**	Mr. W. Bowman.	160
— **No. 8A**	**Oxford**	Sir Henry Fowler.	192
— **No. 9**	**Round City and West End of London** .	Mr. Marriott's representative.	75

which were a repetition of those held on Wednesday, the 24 June, but at Oxford, however, certain colleges, which were closed on the previous visit, were opened to the delegates, parties of whom appreciated very much the opportunity of visiting Magdalen and Christchurch.

In addition to the above, the following excursions, which were similar to those held on Sunday, the 28 June, were arranged, *viz.:*

		Accompanied by	Number attending.
Excursion No. 10 (motor) ...	**Into country, via Guildford**	Mr. Marriott's representative.	35
— **No. 11** —	**Into country, via Dorking**	Mr. Mitchell.	36

TUESDAY, 30 JUNE.

Excursion to National Physical Laboratory, Teddington.

On the invitation of Sir Joseph E. Petavel, K.B.E., 12 delegates, accompanied by Mr. G. W. Woolliscroft and Mr. H. Fowler Junr., visited the above Laboratory, and were particularly interested in the testing of materials, the large tank for experimental testing of the hulls of model ships, and the wind tunnels for aeronautical research purposes.

Reception by His Majesty's Government.

On Tuesday evening, 30 June, a reception by His Majesty's Government was given at Lancaster House, St. James's, the Minister of Transport (Colonel the Right Hon. Wilfred W. ASHLEY) and Mrs. ASHLEY receiving the guests.

About 2 000 guests were invited, including the whole of the delegates, and many prominent public men.

The delegates were particularly interested in the exhibits, including, as they do, so many objects of historical value in connection with the City of London, which are on view at Lancaster House.

THURSDAY, 2 JULY.

Excursion No. 12. — London to Harrogate and Leeds.

About 725 delegates and ladies left King's Cross by four special trains at the following times.

Train A at 2.15 p. m., accompanied by Sir Henry Fowler, Mr. Marriott and Mr. Cane.
Train B at 2.35 p. m., accompanied by Mr. F. A. Brant.
Train C at 2.45 p. m., accompanied by Mr. A. L. Gibson.
Train D at 2.55 p. m., accompanied by Mr. A. Maynard.

Tea was served en route on all the trains.

An excellent run was made to Doncaster, the weather being charming, and the visibility extremely good, Lincoln Cathedral, 15 miles away, being seen clearly.

Harrogate was reached at the following times :

Train A . . at 6.21 p. m.	Train B . . at 6.46 p. m.
Train C . . at 6.53 p. m.	Train D . . at 7.01 p. m.

and Leeds :

Train A . . at 7.10 p. m.	Train B . . at 7.35 p. m.
Train C . at 7.42 p. m.	Train D . . at 7.52 p. m.

Delegates were assigned to various hotels in Harrogate and Leeds.

At Harrogate in the evening the delegates attended the Concert in the Royal Hall, by kind invitation of His Worship the Mayor and Corporation of Harrogate. The invitation consisted of a Concert by the Harrogate orchestra, followed by variety items, and concluded by an enjoyable dance in the Royal Spa Rooms adjoining, at which refreshments were served.

At an interval in the proceedings, the Mayor, Mr. C. E. Carter, welcomed the delegates to Harrogate, to which Sir Henry Fowler responded on behalf of the committee, and Mr. S. O. Dunn, of the *Railway Age*, on behalf of the delegates. A most enjoyable evening was spent.

FRIDAY, 3 JULY.

Excursion No. 13. — Leeds and Harrogate to Darlington.

The delegates left Harrogate and Leeds by the four special trains, previously mentioned, for Darlington, arriving there before mid-day. Here the trains were run directly into the Faverdale Works of the London & North Eastern Railway, where the Centenary Celebrations were being held. An opportunity was given, both before and after the luncheon, of visiting the wonderful collection of locomotives and rolling stock, illustrating the progress of railways from the earliest times to the present day. Within the building itself was housed a most interesting selection of railway relics, and autograph letters of distinguished early engineers.

At 1.30 p. m. luncheon was served in one of the large shops of the wagon works, 1 003 guests being present. The Chair was taken by Mr. Wm. Whitelaw, Chairman of the London & North Eastern Railway, who was supported by Viscount

Grey of Fallodon, Sir Arthur F. Pearse, Bart., Sir Hugh Bell and other directors of the Company; and by Mr. Foulon, president, and other members of the Permanent Commission, and the London Congress.

After the toasts had been honoured by the Chairman, the meeting sent the following loyal greeting to H. M. the King :

The railwaymen and their guests assembled to commemorate the centenary of railways send their loyal greetings to your Majesty, and express the hope that railways may ever be the handmaiden to your Empire's prosperity in the century to come, as they have in the century just completed.

and the following reply was received from His Majesty later on in the day :

I am commanded to convey to the railwaymen and their guests who are commemorating the centenary of railways the sincere thanks of the King for their message of loyal greetings. His Majesty heartily reciprocates the hopes expressed in the telegram that railways in the future will continue to play the great part in the development and prosperity of the Empire that they have done in the past. (*Stamfordham.*)

Mr. FOULON, speaking in French, stated that a message was being sent to the Foreign Secretaries of all countries represented at the Congress in the following terms :

The tenth International Railway Congress assembled to commemorate the centenary of railways at their birthplace, send loyal greetings and express the hope that railways may continue to play the same part in the development of your country's prosperity as they have played in the century just completed.

ITALIAN RAILWAYMEN'S TRIBUTE.

Ing. Cav. Olipio Chiarugi, president of the Executive Committee, speaking in Italian, next presented a huge bronze shield, 12 feet × 7 feet, and weighing a ton, presented by the Italian railwaymen and the Government to the British railwaymen in commemoration of the centenary. It is the work of the famous Italian sculptor, professor Passani of Firenze, and consists of a finely moulded head of Stephenson in medallion form, wreathed in bays, born aloft by two stalwart railwaymen, and bears the Italian white cross and the following inscription :

A Giorgio Stephenson.

—

I
Ferrovieri d'Italia.
MDCCCXXV.
MCMXXV.

It was loaded up in a wagon in Florence the preceding week, and was sent via the Zeebrugge and Harwich train ferry direct to Darlington in its Italian wagon.

The Chairman, in accepting the shield, described it as a great work of Italian art, faithfully representing the physical strength, the intellectual strength, and the strength of character of its subject.

They could not help feeling, looking at it with British eyes, that if Britons prided themselves on their success as railwaymen, they at any rate humbled themselves and gave way to their friends from Italy when it came to questions of art. (*Applause.*) The great characteristics of the man in whose honour the shield was presented, were faith in himself and determination to complete every work which he had once begun. Speaking to their friends from Italy, might he take the liberty of saying that this faith in himself, and determination to accomplish his policy seemed to him to be exemplified in the highest manner in Signor Mussolini, the Prime Minister of Italy. (*Applause.*) He repeated the expression of brotherly feeling and of prospe-

rity to all the nations represented there that day. (*Applause.*)

Dr. C. C. WANG, of China, speaking in English, next presented, on behalf of the Chinese Minister of Communications, Pekin, and also himself, three scrolls of honour, which he said represented the sentiments of appreciation and gratitude from China towards Great Britain at this time when they were celebrating the centenary of railways. Dr. Chin Chun-Wang stated that he had been asked to translate the inscription on the scrolls, and the following was a literal translation :

Here a century ago was born the world-wide system of railway transportation.

Here to-day are gathered the representatives of all nations in praise and celebration, conquering space and linking seas and land.

Leading progress and prosperity hand-in-hand.

Oh, ye Inventor, great benefactor of mankind, yea, we shall for ever enshrime thee in our hearts and our grateful mind.

Mr. WHITELAW acknowledged the gift and delivered an address, during which he extended a hearty welcome to the delegates to the Congress. He said that it would not be possible until later to assess the full value of the meetings which had been held. One could, however, appreciate the advantages which had accrued from the renewal and cementing of many old friendships, and the starting of new ones. He was convinced that meetings like this would help them more and more to get rid of international struggles, and to advance the cause of humanity over the worldwide countries which they served.

Responding, Mr. COLSON, vice-president of the Permanent Commission, paid a glowing tribute to the genius of Stephenson, and traced the history of the locomotive since its invention.

England had not only given to the world this marvellous invention, which had affected such a change in the civilised world, but she had furthermore furnished a large proportion of the capital necessary to develop the railroad industry. The early railways both in North and South America, in Asia, Africa, and other countries, had been financed by the British, and many had been constructed by them. He stated that the present population of Great Britain were reaping the benefit of these investments abroad, which had been made by their forefathers.

Mr. G. A. HARWOOD, vice-president of the New York Central Railroad, and representing the United States of America, also replied.

He pointed out that in the thousands of years of recorded history prior to the opening of the Stockton & Darlington Railway, mankind, by its united efforts, had been able to accumulate wealth estimated at approximately a hundred billion dollars. In the century since that momentous event, the wealth of the world had increased more than tenfold, despite the wastes of war. It was impossible to conceive of such an achievement without the swift and cheap transportation afforded by the railroad. He felt that there were still great opportunities for railroad building and its attendant national development, not only in the British Dominions, but also in China, which at no very distant date, would call for thousands of miles of railway with which to open for the world the gateway, to the vast hinterlands of Asia, with their immense natural resources, which had for so long remained dormant.

— As each speaker rose, the band played the National Anthem of the country which he represented.

Excursion No. 14. — Darlington to Edinburgh and Glasgow.

About 630 delegates and ladies left Darlington by the four special trains, en route for Scotland, two of the trains proceeding over the original Stockton and

Darlington line, tea and coffee, and later on dinner being served on the trains, Edinburgh being reached before 10.0 p. m., and the last train into Glasgow arriving at 10.45 p. m. Fortunately the weather was fine, and charming views were obtained over the sea as the trains ran along the coast.

The delegates were assigned to various hotels in Edinburgh and Glasgow.

Excursion No. 15. — Darlington to London.

About 80 delegates and ladies who did not proceed on excursion N° 14 to Scotland left Darlington at 5.25 p. m. by special train, dinner being served en route, and arrived in London (King's Cross Station) at 10.10 p. m.

SATURDAY, 4 JULY.

Excursion No. 16. — Kyles of Bute.

Two parties were arranged to visit the Kyles of Bute, one from Edinburgh, and the other from Glasgow, and were accompanied by Mr. A. B. Cane and Mr. H. Marriott, the joint secretaries of the Arrangements Committee.

About 400 delegates and ladies took part in this excursion, entraining at Edinburgh at 8.45 a. m., and at Glasgow at 10.5 a. m., and the combined parties embarked on the steamer *Duchess of Argyll* at Wemyss Bay at 11.0 a. m. The party was accompanied by the Pipers of the 21st Glasgow (London Midland & Scottish) Troop of Rovers and Scouts, and Highland Dancers, who added materially to the pleasure of the trip.

Luncheon and tea were served on the steamer, and the parties arrived back at Gourock at 3.0 p. m., the Edinburgh party leaving there at 3.10 p. m., arriving at Edinburgh at 5.0 p. m., whilst the Glasgow party left Gourock at 3.15 p. m., and arrived at Glasgow at 3.55 p. m.

Excursion No. 17. — Round the Trossachs.

The remainder of the delegates and ladies, who did not proceed to the Kyles of Bute, and who numbered 378, visited the Trossachs in four parties. They proceeded via Balloch, Loch Lomond, Loch Katrine, the Trossachs, and Callander, or in the reverse direction. They were accompanied by :

« A » party : Mr. Marriott's representative;
« B » party : Mr. F. A. Brant;
« C » party : Mr. A. L. Gibson and Sir Henry Fowler;
« D » party : Mr. A. Maynard

and the local officers of the Scottish Railways concerned.

On the steamer on Loch Lomond, Pipers attached to the London Midland & Scottish Scouts gave a selection of music. Luncheon was served either at the Trossachs Hotel, or on the steamers on Loch Lomond, and tea on the return journey.

The romantic scenery of the Lochs and the wonderful views through the Trossachs were greatly appreciated, associated as they are with the writings of Sir Walter Scott.

The weather was rather threatening in the morning, but afterwards it turned out a beautiful day, which showed to perfection the gorgeous scenery through which the delegates were passing.

SUNDAY, 5 JULY.

Excursion No. 18. — Glasgow and Edinburgh to London (by London Midland & Scottish Railway).

This Excursion was run in two parts, one from Glasgow and the other from Edinburgh. The Glasgow portion departed at 9.35 a. m., and 98 delegates and ladies elected to return to London by this train, which, running through Carstairs, Carlisle and thence over the old North Western Section of the London

Midland & Scottish Railway afforded some interesting glimpses to the visitors from overseas of both industrial and rural Scotland and England.

The Edinburgh portion departed at 9.30 a. m. with about 130 delegates and ladies, Mr. A. Fulton, district traffic superintendent, Edinburgh, being in charge of the train.

Refreshments were available throughout the day, whilst lunch and tea were served on both trains.

As is customary in England, many permanent way repairs were being carried out on the Sunday, and this resulted in checks which caused the trains eventually to arrive somewhat late at Euston. The majority of delegates, to whom the cause was pointed out, appeared to appreciate this opportunity of noting the difference between their own practice and that in force in this country.

Both trains arrived at Euston Station about 7.0 p. m.

Excursion No. 19. — Glasgow and Edinburgh to Gleneagles and back.

The London Midland & Scottish Railway Company offered this excursion to the delegates, 226 accepting. The parties left Edinburgh and Glasgow at 9.35 a. m. and arrived at Gleneagles at 11.0 a. m.

The party was in charge of Mr. Donald A. Matheson, the deputy general manager of the London Midland & Scottish Railway Company.

The delegates visited the golf courses, and were entertained to luncheon and tea by the London Midland & Scottish Railway at the new and magnificient Gleneagles Hotel. Mr. Matheson welcomed the delegates, on behalf of the London Midland & Scottish Railway Company, and Mr. A. Mange, general manager of the Paris-Orleans Railway, in reply, expressed the delight of the delegates in the opportunity of viewing, under such favourable circumstances, the enterprise of the London Midland & Scottish Railway Company. The weather was extremely good, and the delegates were loud in their praises of the scenery in which Gleneagles is situated.

The party left Gleneagles Hotel by motor bus at 5.30 p. m., and departed from the station at 6.0 p. m. arriving at Edinburgh and Glasgow at 7.20 p. m.

Excursion No. 20. — Edinburgh and Glasgow to Turnberry and back.

160 delegates and ladies left Edinburgh and Glasgow at 9.20 a. m. and 10.30 a. m. respectively for Turnberry, which excursion was also offered by the London Midland & Scottish Railway Company, the trip via the coast being particularly enjoyable.

The party was accompanied by Sir Henry Fowler, and also Mr. R. Killin, general superintendent (Northern Division), London Midland & Scottish Railway, Glasgow.

Unfortunately on arrival at Turnberry the visibility was poor, and the delegates missed the wonderful panorama of the West of Scotland and North of Ireland, which can be seen on clear days.

Luncheon was served at the Turnberry Hotel, at which Mr. Killin welcomed the delegates on behalf of the London Midland & Scottish Railway Company. Mr. Ito, of the Japanese Government Railways, and Mr. Sapin, general manager of a number of small railways in France and Italy replied. During the course of Mr. Sapin's eloquent speech, he stated that in his opinion « L. M. S. » stood for « Les Meilleurs Souvenirs », which was endorsed by the members present.

The party left Turnberry at 3.45 p. m., and on their return journey a visit was made to Alloway, the birthplace of the poet Burns, and also to the Brig o'Doune, the scene of some of his well-known poems.

The party left Alloway at 5.10 p. m.,

tea being served on the journey, and arrived at Glasgow and Edinburgh at 6.30 p. m. and 7.30 p. m. respectively.

MONDAY, 6 JULY.

Excursion No. 21. — Glasgow and Edinburgh to London.

The delegates and ladies returned on two trains, the one from Glasgow leaving at 9.15 a. m. with 115, the other from Edinburgh, leaving at 10.25 a. m., with 120.

Messrs. H. Marriott and A. L. Gibson accompanied the first train, and Mr. Brant the latter one.

Luncheon and tea were served en route, and the trains arrived at the London & North Eastern Company's Station at King's Cross at about 6.45 p. m.

TUESDAY, 7 JULY.

Excursion No. 22. — London to Toton sidings, and the London Midland & Scottish carriage and wagon workshops, Derby, and the Peak District.

An excursion to Toton Sidings, the London Midland & Scottish carriage and wagon works at Derby, and the Peak District was offered by the London Midland & Scottish Railway.

The party left London (St. Pancras Station) at 9.55 a. m., the weather at the time of departure being extremely wet, and only 161 delegates and ladies joined the train. As the journey was made North, the weather improved materially, and finally was all that could be desired.

The Company provided, in English and French, a specially written itinerary of the various points of interest during the course of the journey.

The party was accompanied by Sir Henry Fowler, chairman of the Arrangements Sub-Committee, and Mr. J. Murray, outdoor assistant to the chief general superintendent of the London Midland & Scottish Railway, was in charge of the train on behalf of the Railway Company. Mr. and Mrs. Foulon were amongst those who took part in the trip.

Luncheon was served between London and Toton Sidings, arriving there at 12.20 p. m., and at which point many of the delegates de-trained, and watched the shunting operations in the large yard.

On arriving at Derby at 1.16 p. m., the gentlemen of the party visited the carriage and wagon workshops, where Mr. R. W. Reid, the carriage and wagon superintendent of the London Midland & Scottish Railway, and his assistants, had planned a visit enabling the delegates to see the modern methods of carriage and wagon building by mass production.

In the meantime, the ladies of the party were taken on by special train to Rowsley, arriving there at 2.0 p. m. They were then driven in charabancs, via Chatsworth, Edensor, Baslow, Calver, Middleton Dale, Wardlow, Monsal Head, Ashford, Bakewell and Haddon Hall, viewing the latter place.

The gentlemen left the carriage and wagon works, Derby, at 3.0 p. m., and, having tea on the train, arrived at Rowsley at 3.38 p. m. They proceeded by charabancs to Haddon Hall, and like the ladies, looked over the Hall.

The ladies, after visiting Haddon Hall, were conveyed to Bakewell, where tea was served at the Rutland Arms Hotel, afterwards joining the gentlemen on the road, and the party returned to Cromford, and entrained for London at 5.50 p. m. Dinner was served on the journey, and London (St. Pancras Station) was reached at 8.50 p. m.